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TOSHIBA

FILE NO. A03-003F

SERVICE MANUAL/INTEGRATION

AIR-CONDITIONER
SPLIT TYPE

OUTDOOR UNIT

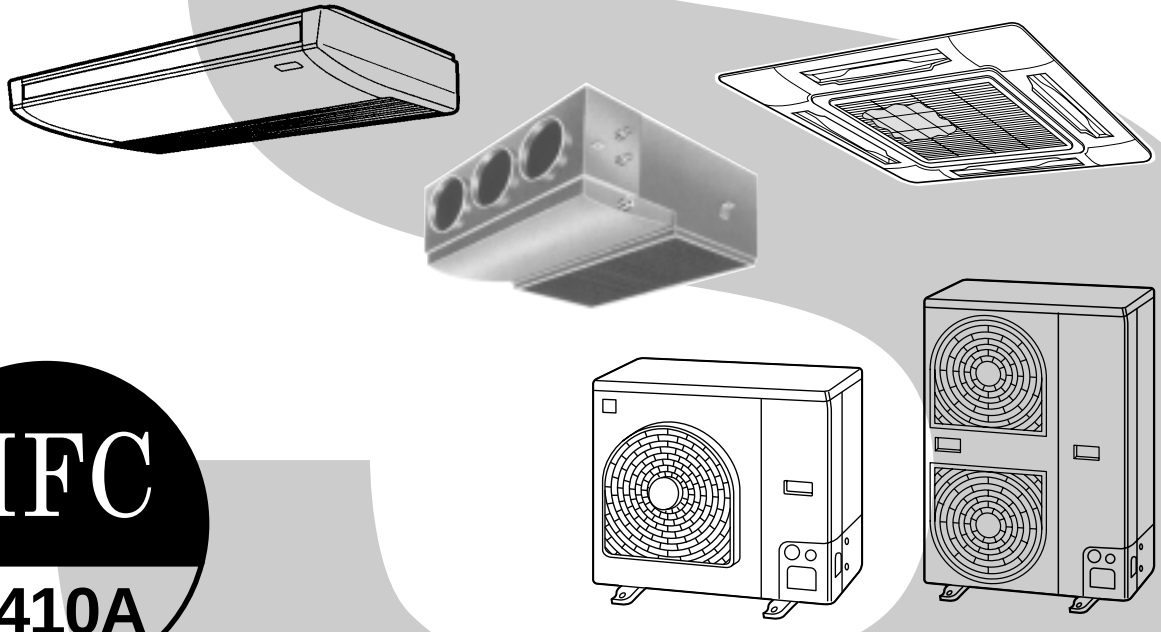
<SUPER DIGITAL INVERTER>
RAV-SP560AT-E, RAV-SP800AT-E, RAV-SP1100AT-E, RAV-SP1400AT-E

<DIGITAL INVERTER>
RAV-SM560AT-E, RAV-SM800AT-E, RAV-SM1100AT-E, RAV-SM1400AT-E

INDOOR UNIT

<SUPER DIGITAL INVERTER>
RAV-SP1100UT-E

<DIGITAL INVERTER>
RAV-SM560UT-E, RAV-SM560BT-E, RAV-SM561BT-E, RAV-SM561CT-E, RAV-SM800UT-E, RAV-SM800BT-E, RAV-SM801BT-E, RAV-SM801CT-E, RAV-SM1100UT-E, RAV-SM1101CT-E, RAV-SM1101BT-E, RAV-SM1400UT-E, RAV-SM1401CT-E, RAV-SM1401BT-E



HFC
R410A

PRINTED IN JAPAN, Jun.,2004 ToMo

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ADOPTION OF NEW REFRIGERANT

This Air Conditioner is a new type which adopts a new refrigerant HFC (R410A) instead of the conventional refrigerant R22 in order to prevent destruction of the ozone layer.

WARNING

Cleaning of the air filter and other parts of the air filter involves dangerous work in high places, so be sure to have a service person do it. Do not attempt it yourself. The cleaning diagram for the air filter is there for the service person, and not for the customer.

Service Manual Table
FILE NO. for Owner's Manual / Service Manual

Type / RAV- / name		Indoor unit				Outdoor unit	
		UT-E	BT-E		CT-E	AT-E	SP
			AC motor SM**0BT-E SM***0BT-E	DC motor SM**1BT-E SM***1BT-E	SM**1CT-E SM***1CT-E		SP**AT-E SP***AT-E
SM560	O/M S/M	A02-013 A02-014	A02-013 A02-014	A03-006 A03-007	A03-015 A03-016	A02-013 A02-014	A03-013 A03-014
SM800	O/M S/M	A02-013 A02-014	A02-013 A02-014	A03-006 A03-007	A03-015 A03-016	A02-013 A02-014	A03-013 A03-014
SM1100	O/M S/M	A03-002 A03-003	—	A03-006 A03-007	A03-015 A03-016	A03-002 A03-003	A03-013 A03-014
SM1400	O/M S/M	A03-002 A03-003	—	A03-006 A03-007	A03-015 A03-016	A03-002 A03-003	A03-013 A03-014
SP1100	O/M S/M	A03-013 A03-014	—	—	—	—	A03-013 A03-014

* O/M : OWNER'S MANUAL, INSTALLATION MANUAL
* S/M : SERVICE MANUAL

NOTICE

Concerning models for **RAV-SM **** KRT-E**, and **RAV-SM **** XT-E** series, please contact the following company ;

Toshiba Carrier (Thailand) Co., Ltd.
144/9 Moo 5, BangKadi Indastrial park,
Tivanon Road, Tambol BangKadi, Amphur Muang,
Pathumthani 12000, Thailand

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CONTENTS

1. SPECIFICATIONS 4
   1-1. Indoor Unit 4
   1-2. Outdoor Unit 10
   1-3. Combination Specifications of Indoor Units with Outdoor Units 14
   1-4. Operation Characteristic Curve 17
2. AIR DUCTING WORK 24
   2-1. Static Pressure Characteristics of Each Model 24
3. CONSTRUCTION VIEWS (EXTERNAL VIEWS) 27
   3-1. Indoor Unit 27
   3-2. Outdoor Unit 32
4. SYSTEMATIC REFRIGERATING CYCLE DIAGRAM 35
   4-1. Indoor Unit/Outdoor Unit 35
5. WIRING DIAGRAM 43
   5-1. Indoor Unit 43
   5-2. Outdoor Unit 47
6. SPECIFICATIONS OF ELECTRICAL PARTS 50
   6-1. Indoor Unit 50
   6-2. Outdoor Unit 52
   6-3. Accessory Separate Soldparts 54
7. REFRIGERANT R410A 55
   7-1. Safety During Installation/Servicing 55
   7-2. Refrigerant Piping Installation 55
   7-3. Tools 59
   7-4. Recharging of Refrigerant 60
   7-5. Brazing of Pipes 61
8. CONTROL BLOCK DIAGRAM 63
   8-1. Indoor Control Circuit 63
   8-2. Control Specifications 65
   8-3. Indoor Print Circuit Board 65
9. CIRCUIT CONFIGURATION AND CONTROL SPECIFICATIONS 87
   9-1. Microcomputer System Block Diagram 87
   9-2. Indoor Control Circuit 95
   9-3. Outdoor Controls 98
10. TROUBLESHOOTING 117
   10-1. Summary of Troubleshooting 117
   10-2. Check Code List 119
   10-3. Error Mode Detected by LED on Outdoor P.C. Board 122
   10-4. Troubleshooting Procedure for Each Check Code 125
11. REPLACEMENT OF SERVICE INDOOR P.C. BOARD 146
12. SETUP AT LOCAL SITE AND OTHERS 150
   12-1. Indoor Unit 150
   12-2. Network Adapter 159
   12-3. How to Set an Address Number 161
   12-4. Display and Operation of Main Remote Controller and Central Control Remote Controller 163
13. ADDRESS SETUP 164
   13-1. Address Setup 164
   13-2. Address Setup & Group Control 165
   13-3. Address Setup 166
14. DETACHMENTS 169
   14-1. Indoor Unit 169
   14-2. Outdoor Unit 187
15. EXPLODED VIEWS AND PARTS LIST 211
   15-1. Indoor Unit 211
   15-2. Outdoor Unit 227
   15-3. Replacement of Main Parts (Sold Separately) 237
16. CORD HEATER INSTALLATION WORK 239

APPENDIX-1

1. SDI combination, Indoor / Outdoor 1
2. Service parts for 4-way Cassette Type 1
3. Specification for Concealed Duct Type 2
4. Service parts for Concealed Duct Type 2
5. Service parts for Under Ceiling Type 3
6. Service PCB Replacement 4
7. Indoor unit & Remote controller 5
8. Connecting cable for Remote controllers 5

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1. SPECIFICATIONS

1-1. Indoor Unit

1-1-1. 4-Way Air Discharge Cassette Type

RAV-SM560UT-E, RAV-SM800UT-E (A02-014)

Model name				RAV-SM560UT-E			RAV-SM800UT-E		
Standard capacity (Note 1)			(kW)	Cooling	Heating	Average	Cooling	Heating	Average
				5.3 (1.5 – 5.6)	5.6 (1.5 – 6.3)		7.1 (2.2 – 8.0)	8.0 (2.2–9.0)	
Heating low temp. capacity (Note 1) (kW)				4.9			7		
Energy consumption effect ratio (Cooling)				3.01 [B]	3.90 [A]	3.46	3.03 [B]	3.45 [B]	3.24
Electrical characteristics	Power supply			1 phase 230V (220 – 240V) 50Hz					
	Running current		(A)	8.42–7.72	6.78–6.29		11.32–10.37	11.22–10.28	
	Power consumption		(kW)	1.76	1.435		2.34	2.32	
	(Low temp.)		(kW)	1.89			2.73		
	Power factor		(%)	95	95		94	94	
Appearance	Main unit			Zinc hot dipping steel plate					
	Ceiling Panel (Sold separately)	Model		RBC-U21PG (W) E					
		Panel color		Moon-white (Muncel 2.5GY 9.0/0.5)					
Outer dimension	Main unit	Height	(mm)	256					
		Width	(mm)	840					
		Depth	(mm)	840					
	Ceiling panel (Sold separately)	Height	(mm)	53					
		Width	(mm)	950					
		Depth	(mm)	950					
Total weight	Main unit		(kg)	21			22		
	Ceiling panel			4.5					
Heat exchanger				Finned tubu					
Soundproof/Heat-insulating material				Inflammable polyethylene foam			Foamed polyethylen		
Fan unit	Fan			Turbo fan					
	Standard air flow High (Mid./Low)		(m^3/h)	1050			1200		
	Motor		(W)	60					
Air filter				Attached ceiling panel					
Controller (Sold separately)				RBC-AMT21E					
Connecting pipe	Gas side		(mm)	Ø12.7 (1/2")			Ø15.9 (5/8")		
	Liquid side		(mm)	Ø6.4 (1/4")			Ø9.5 (3/8")		
	Drain port		(Nominal dia.)	25 (Polyvinyl chloride tube)					
Sound level	High (Mid./Low) (Note 2)		(dB•A)	32	29	27	34	31	28

Note 1 : The cooling capacities and electrical characteristics are measured under the conditions speciied by JIS B 8616 based on the reference piping 7.5m.

Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

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RAV-SM1100UT-E, RAV-SM1400UT-E (A03-003)

Model name				RAV-SM1100UT-E			RAV-SM1400UT-E		
Standard capacity (Note 1)			(kW)	**Cooling**	**Heating**	**Average**	**Cooling**	**Heating**	**Average**
				10.0 (2.2 – 11.2)	11.2 (2.2 – 13.0)		12.3 (3.0 – 13.2)	14.0 (3.0 – 16.0)	
Energy consumption effect ratio (Cooling)				2.84	3.22	3.03	3.01	3.50	3.26
Electrical characteristics	Power supply			1 phase 230V (220 – 240V) 50Hz					
	Running current		(A)	16.3–15.0	16.1–14.8		19.2–17.6	18.7–17.2	
	Power consumption		(kW)	3.52	3.48		4.09	4.00	
	Power factor		(%)	98	98		97	97	
Appearance	Main unit			Zinc hot dipping steel plate					
	Ceiling Panel (Sold separately)	Model		RBC-U21PG (W)-E					
		Panel color		Moon-white (Muncel 2.5GY 9.0/0.5)					
Outer dimension	Main unit	Height	(mm)	319					
		Width	(mm)	840					
		Depth	(mm)	840					
	Ceiling panel (Sold separately)	Height	(mm)	35					
		Width	(mm)	950					
		Depth	(mm)	950					
Total weight	Main unit		(kg)	26					
	Ceiling panel			4.5					
Heat exchanger				Finned tubu					
Fan unit	Fan			Turbo fan					
	Standard air flow High (Mid./Low)		(m^3/h)	1680			1980		
	Motor		(W)	90					
Air filter				Attached ceiling panel					
Controller (Sold separately)				RBC-AMT21E					
Connecting pipe	Gas side		(mm)	Ø15.9 (5/8”)					
	Liquid side		(mm)	Ø9.5 (3/8”)					
	Drain port		(Nominal dia.)	25 (Polyvinyl chloride tube)					
Sound level	High (Mid./Low) (Note 2)		(dB•A)	39	36	33	42	38	34

Note 1 : The cooling capacities and electrical characteristics are measured under the conditions speciied by JIS B 8616 based on the reference piping 7.5m.

Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SP1100UT-E (A03-014)

Model name				RAV-SP1100UT-E
Appearance	Main unit			Zinc hot dipping steel plate
	Ceiling Panel (Sold separately)	Model		RBC-U21PG (W)-E
		Panel color		Moon-white (Muncel 2.5GY 9.0/0.5)
Outer dimension	Main unit	Height	(mm)	319
		Width	(mm)	840
		Depth	(mm)	840
	Ceiling panel (Sold separately)	Height	(mm)	35
		Width	(mm)	950
		Depth	(mm)	950
Total weight	Main unit		(kg)	26
	Ceiling panel			4.5
Heat exchanger				Finned tube
Fan unit	Fan			Turbo fan
	Standard air flow High (Mid./Low)		(m^3/h)	1680
	Motor		(W)	90
Air filter				Attached ceiling panel
Controller (Sold separately)				RBC-AMT21E
Connecting pipe	Gas side		(mm)	Ø15.9 (5/8”)
	Liquid side		(mm)	Ø9.5 (3/8”)
	Drain port		(Nominal dia.)	25 (Polyvinyl chloride tube)

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1-1-2. Concealed Duct Type

RAV-SM560BT-E, RAV-SM800BT-E (A02-014)

Model name				RAV-SM560BT-E			RAV-SM800BT-E		
Standard capacity (Note 1)			(kW)	Cooling	Heating	Average	Cooling	Heating	Average
				5 (1.5 – 5.6)	5.6 (1.5 – 6.3)		7.1 (2.2 – 8.0)	8 (2.2–9.0)	
Heating low temp. capacity (Note 1) (kW)				4.6			6.2		
Energy consumption effect ratio (Cooling)				2.60 [D]	3.27 [C]	2.94	2.73 [D]	3.21 [C]	2.97
Electrical characteristics	Power supply			1 phase 230V (220 – 240V) 50Hz					
	Running current		(A)	9.19–8.42	8.18–7.50		12.57–11.52	12.04–11.04	
	Power consumption		(kW)	1.92	1.71		2.6	2.49	
	(Low temp.)		(kW)	1.78			2.62		
	Power factor		(%)	95	95		94	94	
Appearance	Main unit			Zinc hot dipping steel plate					
	Ceiling Panel (Sold separately)	Model		——					
		Panel color		——					
Outer dimension	Main unit	Height	(mm)	320					
		Width	(mm)	700					
		Depth	(mm)	800 (+7.5)					
	Ceiling panel (Sold separately)	Height	(mm)	——					
		Width	(mm)	——					
		Depth	(mm)	——					
Total weight	Main unit		(kg)	39			53		
	Ceiling panel			——					
Heat exchanger				Finned tubu					
Soundproof/Heat-insulating material				Inflammable polyethylene foam			Foamed polyethylen		
Fan unit	Fan			Turbo fan					
	Standard air flow High (Mid./Low)		(m^3/h)	840			1140		
	Motor		(W)	60			100		
Air filter				Attached main unit					
Controller (Sold separately)				RBC-AMT21E					
Connecting pipe	Gas side		(mm)	Ø12.7 (1/2")			Ø15.9 (5/8")		
	Liquid side		(mm)	Ø6.4 (1/4")			Ø9.5 (3/8")		
	Drain port		(Nominal dia.)	25 (Polyvinyl chloride tube)					
Sound level	High (Mid./Low) (Note 2)		(dB•A)	42	39	36	43	40	37

Note 1 : The cooling capacities and electrical characteristics are measured under the conditions speciied by JIS B 8616 based on the reference piping 7.5m.

Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

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RAV-SM561BT-E, RAV-SM801BT-E (A03-007)

Model name				RAV-SM561BT-E			RAV-SM801BT-E		
Standard capacity (Note 1)			(kW)	Cooling	Heating	Average	Cooling	Heating	Average
				5.0 (1.5 – 5.6)	5.6 (1.5 – 6.3)		7.1 (2.2 – 8.0)	8.0 (2.2 – 9.0)	
Heating low temp. capacity (Note 1) (kW)				4.6			6.2		
Energy consumption effect ratio (Cooling)				2.81 [C]	3.27 [C]	3.04	2.81 [C]	3.32 [C]	3.07
Electrical characteristics	Power supply			1 phase 230V (220 – 240V) 50Hz					
	Running current		(A)	8.99–8.24	8.18–7.50		12.23–11.21	11.65–10.68	
	Power consumption		(kW)	1.78	1.71		2.53	2.41	
	(Low temp.)		(kW)	1.98			2.86		
	Power factor		(%)	95	95		94	94	
Appearance	Main unit			Zinc hot dipping steel plate					
	Ceiling Panel (Sold separately)	Model		——					
		Panel color		——					
Outer dimension	Main unit	Height	(mm)	320			320		
		Width	(mm)	700			1000		
		Depth	(mm)	800			800		
	Ceiling panel (Sold separately)	Height	(mm)	——					
		Width	(mm)	——					
		Depth	(mm)	——					
Total weight	Main unit		(kg)	30			39		
	Ceiling panel			——					
Heat exchanger				Finned tubu					
Soundproof/Heat-insulating material				Inflammable polyethylene foam					
Fan unit	Fan			Multi-blade fan					
	Standard air flow High (Mid./Low)		(m^3/h)	840			1140		
	Motor		(W)	120			120		
Air filter				Attached main unit					
Controller (Sold separately)				RBC-AMT21E					
Connecting pipe	Gas side		(mm)	Ø12.7 (1/2”)			Ø15.9 (5/8”)		
	Liquid side		(mm)	Ø6.4 (1/4”)			Ø9.5 (3/8”)		
	Drain port		(Nominal dia.)	25 (Polyvinyl chloride tube)					
Sound level	High (Mid./Low) (Note 2)		(dB•A)	42	39	36	43	40	37

Note 1 : The cooling capacities and electrical characteristics are measured under the conditions specified by JIS B 8616 based on the reference piping 7.5m.

Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

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RAV-SM1101BT-E, RAV-SM1401BT-E (A03-007)

Model name				RAV-SM1101BT-E			RAV-SM1401BT-E		
Standard capacity (Note 1)			(kW)	**Cooling**	**Heating**	**Average**	**Cooling**	**Heating**	**Average**
				10.0 (2.2 – 11.2)	11.2 (2.2 – 12.5)		12.5 (3.0 – 13.2)	14.0 (3.0 – 16.0)	
Heating low temp. capacity (Note 1) (kW)				8.7			11.8		
Energy consumption effect ratio (Cooling)				2.81 [C]	3.57 [B]	3.19	2.83 [C]	3.47 [B]	3.15
Electrical characteristics	Power supply			1 phase 230V (220 – 240V) 50Hz					
	Running current		(A)	16.5–15.1	14.6–13.4		20.7–19.0	18.9–17.3	
	Power consumption		(kW)	3.56	3.14		4.42	4.03	
	(Low temp.)		(kW)	3.50			4.18		
	Power factor		(%)	98	98		97	97	
Appearance	Main unit			Zinc hot dipping steel plate					
	Ceiling Panel (Sold separately)	Model		——					
		Panel color		——					
Outer dimension	Main unit	Height	(mm)	320					
		Width	(mm)	1340					
		Depth	(mm)	800					
	Ceiling panel (Sold separately)	Height	(mm)	——					
		Width	(mm)	——					
		Depth	(mm)	——					
Total weight	Main unit		(kg)	54			54		
	Ceiling panel			——					
Heat exchanger				Finned tubu					
Soundproof/Heat-insulating material				Inflammable polyethylene foam					
Fan unit	Fan			Multi-blade fan					
	Standard air flow High (Mid./Low)		(m^3/h)	1620			1980		
	Motor		(W)	120			120		
Air filter				Attached main unit					
Controller (Sold separately)				RBC-AMT21E					
Connecting pipe	Gas side		(mm)	Ø15.9 (5/8”)					
	Liquid side		(mm)	Ø9.5 (3/8”)					
	Drain port		(Nominal dia.)	25 (Polyvinyl chloride tube)					
Sound level	High (Mid./Low) (Note 2)		(dB•A)	42	39	36	44	41	38

Note 1 : The cooling capacities and electrical characteristics are measured under the conditions specified by JIS B 8616 based on the reference piping 7.5m.

Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

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1-1-3. Under Ceiling Type

RAV-SM561CT-E, RAV-SM801CT-E (A03-016)

Model name				RAV-SM561CT-E			RAV-SM801CT-E		
Standard capacity (Note 1)			(kW)	Cooling	Heating	Average	Cooling	Heating	Average
				5.0 (1.5 – 5.6)	5.6 (1.5 – 6.3)		7.0 (2.2 – 8.0)	8.0 (2.2 – 9.0)	
Energy consumption effect ratio (Cooling)				2.75 [D]	3.41 [B]	3.08	2.77 [D]	3.24 [C]	3.01
Electrical characteristics	Power supply			1 phase 230V (220 – 240V) 50Hz					
	Running current		(A)	8.71–7.98	7.85–7.19		12.23–11.21	11.94–10.95	
	Power consumption		(kW)	1.82	1.64		2.53	2.47	
	Power factor		(%)	95	95		94	94	
Appearance	Main unit			Shine white					
Outer dimension	Main unit	Height	(mm)	210			210		
		Width	(mm)	680			680		
		Depth	(mm)	910			1180		
Total weight	Main unit		(kg)	20			25		
Heat exchanger				Finned tubu					
Soundproof/Heat-insulating material				Inflammable polyethylene foam					
Fan unit	Fan			Multi-blade fan					
	Standard air flow High (Mid./Low)		(m^3/h)	840			1140		
	Motor		(W)	60			60		
Air filter				Attached main unit					
Controller (Sold separately)				RBC-AMT21E					
Connecting pipe	Gas side		(mm)	Ø12.7 (1/2")			Ø15.9 (5/8")		
	Liquid side		(mm)	Ø6.4 (1/4")			Ø9.5 (3/8")		
	Drain port		(Nominal dia.)	25 (Polyvinyl chloride tube)					
Sound level	High (Mid./Low) (Note 2)		(dB•A)	36	33	30	38	36	33

Note 1 : The cooling and heating capacities and electrical characteristics are measured under the conditions specified by JIS B 8616 based on the reference piping 7.5m.

Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM1101CT-E, RAV-SM1401CT-E (A03-016)

Model name				RAV-SM1101CT-E			RAV-SM1401CT-E		
Standard capacity (Note 1)			(kW)	**Cooling**	**Heating**	**Average**	**Cooling**	**Heating**	**Average**
				10.0 (2.2 – 11.2)	11.2 (2.2 – 12.5)		12.3 (3.0 – 13.2)	14.0 (3.0 – 16.0)	
Energy consumption effect ratio (Cooling)				2.85 [C]	3.50 [B]	3.18	2.72 [D]	3.38 [C]	3.05
Electrical characteristics	Power supply			1 phase 230V (220 – 240V) 50Hz					
	Running current		(A)	16.2–14.9	14.84–13.61		21.18–19.40	19.40–17.78	
	Power consumption		(kW)	3.51	3.20		4.52	4.14	
	Power factor		(%)	98	98		97	97	
Appearance	Main unit			Shine white					
Outer dimension	Main unit	Height	(mm)	210					
		Width	(mm)	680					
		Depth	(mm)	1595					
Total weight	Main unit		(kg)	42					
Heat exchanger				Finned tubu					
Soundproof/Heat-insulating material				Inflammable polyethylene foam					
Fan unit	Fan			Multi-blade fan					
	Standard air flow High (Mid./Low)		(m^3/h)	1620			1980		
	Motor		(W)	120			120		
Air filter				Attached main unit					
Controller (Sold separately)				RBC-AMT21E					
Connecting pipe	Gas side		(mm)	Ø15.9 (5/8”)					
	Liquid side		(mm)	Ø9.5 (3/8”)					
	Drain port		(Nominal dia.)	25 (Polyvinyl chloride tube)					
Sound level	High (Mid./Low) (Note 2)		(dB•A)	41	38	35	43	40	37

Note 1 : The cooling and heating capacities and electrical characteristics are measured under the conditions specified by JIS B 8616 based on the reference piping 7.5m.

Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

1-2. Outdoor Unit

RAV-SM560AT-E, RAV-SM800AT-E (A02-14)

Model name				RAV-SM560AT-E	RAV-SM800AT-E
Appearance				Silky shade (Muncel 1Y8.5/0.5)	
Power supply				1 phase 230V (220 – 240V) 50Hz (Power exclusive to outdoor is required.)	
Compressor	Type			Hermetic compressor	
	Motor		(kW)	1.1	1.6
	Pole			4 poles	
Refrigerant charged			(kg)	R410A 0.9	R410A 1.5
Refrigerant control				Pulse motor valve	
Pipe	Standard length			20 (without additional charge)	
	Max. total length		(m)	30	50
	Over 20m			Add 20g/m (Max. 200g)	Add 40g/m (Max. 1200g)
	Height difference	Outdoor lower	(m)	15	
		Outdoor higher	(m)	30	
Outer dimension	Height		(mm)	595	795
	Width		(mm)	780	780
	Depth		(mm)	270	270
Total weight			(kg)	35	55
Heat exchanger				Finned tube	
Fan unit	Fan			Propeller fan	
	Standard air flow High		(m^3/h)	2400	3400
	Motor		(W)	43	63
Connecting pipe	Gas side		(mm)	Ø12.7 (1/2”)	Ø15.9 (5/8”)
	Liquid side		(mm)	Ø6.4 (1/4”)	Ø9.5 (3/8”)
Protection device				Discharge temp. sensor Over-current sensor Compressor thermo.	
Sound level (Note 2)	High (Mid./Low) (Cooling/Heating)		(dB•A)	46/48	45/50

Note 1 : The cooling capacities and electrical characteristics are measured under the conditions speciied by JIS B 8616 based on the reference piping 7.5m.

Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM1100AT-E, RAV-SM1400AT-E (A03-003)

Model name				RAV-SM1100AT-E	RAV-SM1400AT-E
Appearance				Silky shade (Muncel 1Y8.5/0.5)	
Power supply				1 phase 230V (220 – 240V) 50Hz (Power exclusive to outdoor is required.)	
Compressor	Type			Hermetic compressor	
	Motor		(kW)	2.0	3.75
	Pole			4 poles	
Refrigerant charged			(kg)	R410A 2.1	R410A 2.3
Refrigerant control				Pulse motor valve	
Pipe	Standard length			20 (without additional charge)	
	Max. total length		(m)	50	
	Over 20m			Add 40g/m (Max. 1200g)	
	Height difference	Outdoor lower	(m)	15	
		Outdoor higher	(m)	30	
Outer dimension	Height		(mm)	1340	
	Width		(mm)	900	
	Depth		(mm)	320	
Total weight			(kg)	75	85
Heat exchanger				Finned tube	
Fan unit	Fan			2 propeller fans	
	Standard air flow High		(m^3/h)	6800	7500
	Motor		(W)	63 + 43	63 + 63
Connecting pipe	Gas side		(mm)	Ø15.9 (5/8”)	
	Liquid side		(mm)	Ø9.5 (3/8”)	
Protection device				Discharge temp. sensor Over-current sensor Compressor thermo.	
Sound level (Note 2)	High (Mid./Low) (Cooling/Heating)		(dB•A)	53/54	53/54

Note 1 : The cooling capacities and electrical characteristics are measured under the conditions speciied by JIS B 8616 based on the reference piping 7.5m.

Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SP560AT-E, RAV-SP800AT-E (A03-14)

Model name				RAV-SP560AT-E	RAV-SP800AT-E
Appearance				Silky shade (Muncel 1Y8.5/0.5)	
Power supply				1 phase 230V (220 – 240V) 50Hz (Power exclusive to outdoor is required.)	
Compressor	Type			Hermetic compressor	
	Motor		(kW)	2.0	
	Pole			4 poles	
Refrigerant charged			(kg)	R410A 1.5	R410A 2.1
Refrigerant control				Pulse motor valve	
Pipe	Standard length		(m)	20 (without additional charge)	30 (without additional charge)
	Max. total length		(m)	50	
	Over			Over 20m : Add 20g/m (Max. 600g)	Over 30m : Add 40g/m (Max. 800g)
	Height difference	Outdoor lower	(m)	15	
		Outdoor higher	(m)	30	
Outer dimension	Height		(mm)	795	
	Width		(mm)	900	
	Depth		(mm)	320	
Total weight			(kg)	55	62
Heat exchanger				Finned tube	
Fan unit	Fan			Propeller fan	
	Standard air flow High		(m^3/h)	3400	
	Motor		(W)	63	
Connecting pipe	Gas side		(mm)	Ø12.7 (1/2”)	Ø15.9 (5/8”)
	Liquid side		(mm)	Ø6.4 (1/4”)	Ø9.5 (3/8”)
Protection device				Discharge temp. sensor Over-current sensor Compressor thermo.	
Sound level (Note 2)	(Cooling/Heating)		(dB•A)	46/47	47/49

Note 1 : The cooling capacities and electrical characteristics are measured under the conditions specified by JIS B 8616 based on the reference piping 7.5m.

Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SP1100AT-E, RAV--SP1400AT-E (A03-14)

Model name				RAV-SP1100AT-E	RAV-SP1400AT-E
Appearance				Silky shade (Muncel 1Y8.5/0.5)	
Power supply				1 phase 230V (220 – 240V) 50Hz (Power exclusive to outdoor is required.)	
Compressor	Type			Hermetic compressor	
	Motor		(kW)	3.75	
	Pole			4 poles	
Refrigerant charged			(kg)	R410A 2.95	
Refrigerant control				Pulse motor valve	
Pipe	Standard length		(m)	30 (without additional charge)	
	Max. total length		(m)	70	
	Over 30m			Add 40g/m (Max. 1600g)	
	Height difference	Outdoor lower	(m)	15	
		Outdoor higher	(m)	30	
Outer dimension	Height		(mm)	1340	
	Width		(mm)	900	
	Depth		(mm)	320	
Total weight			(kg)	95	
Heat exchanger				Finned tube	
Fan unit	Fan			2 Propeller fans	
	Standard air flow High		(m^3/h)	7500	
	Motor		(W)	63 + 63	
Connecting pipe	Gas side		(mm)	Ø15.9 (5/8”)	
	Liquid side		(mm)	Ø9.5 (3/8”)	
Protection device				Discharge temp. sensor Over-current sensor Compressor thermo.	
Sound level (Note 2)	(Cooling/Heating)		(dB•A)	49/51	53/54

Note 1 : The cooling capacities and electrical characteristics are measured under the conditions specified by JIS B 8616 based on the reference piping 7.5m.

Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

1-3. Combination Specifications of Indoor Units with Outdoor Units

4-way Air Discharge Cassette type

RAV-SM560UT-E, RAV-SM800UT-E, RAV-SP1100UT-E, RAV-SM1400UT-E
RAV-SP560AT-E, RAV-SP800AT-E, RAV-SP1100AT-E, RAV-SP1400AT-E

Indoor Unit			**RAV-SM560UT-E**		**RAV-SM800UT-E**		**RAV-SP1100UT-E**		**RAV-SM1400UT-E**	
Outdoor Unit			**RAV-SP560AT-E**		**RAV-SP800AT-E**		**RAV-SP1100AT-E**		**RAV-SP1400AT-E**	
Standard capacity (Note 1)		(kW)	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
			5.30 (2.20-5.60)	5.60 (2.20-7.10)	7.10 (2.20-8.00)	8.00 (2.20-10.00)	10.00 (3.00-12.00)	11.20 (3.00-13.00)	12.50 (3.00-14.00)	14.00 (3.00-16.50)
Energy consumption effect ratio			3.46	4.67	3.68	3.94	4.17	4.27	3.51	3.91
Electrical characteristics	Power supply		1 phase 230V (220-240V) 50Hz							
	Running current	(A)	7.17-6.57	5.62-5.15	8.95-8.21	9.42-8.63	11.24-10.31	12.28-11.25	16.51-15.14	16.60-15.22
	Power consumption	(kW)	1.53	1.20	1.93	2.03	2.40	2.62	3.56	3.58
	Power factor	(%)	97	97	98	98	97	97	98	98
Sound level Indoor unit	High/Mid./Low (Note 2)	(dB•A)	32/29/27		34/31/28		39/36/33		42/38/34	

Concealed Duct type

RAV-SM561BT-E, RAV-SM801BT-E, RAV-SM1101BT-E, RAV-SM1401BT-E
RAV-SP560AT-E, RAV-SP800AT-E, RAV-SP1100AT-E, RAV-SP1400AT-E

Indoor Unit			**RAV-SM561BT-E**		**RAV-SM801BT-E**		**RAV-SM1101BT-E**		**RAV-SM1401BT-E**	
Outdoor Unit			**RAV-SP560AT-E**		**RAV-SP800AT-E**		**RAV-SP1100AT-E**		**RAV-SP1400AT-E**	
Standard capacity (Note 1)		(kW)	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
			5.00 (2.20-5.60)	5.60 (2.20-7.00)	7.10 (2.20-8.00)	8.00 (2.20-10.00)	10.00 (3.00-12.00)	11.20 (3.00-13.00)	12.50 (3.00-14.00)	14.00 (3.00-16.50)
Energy consumption effect ratio			3.60	4.67	3.38	3.94	4.00	4.27	3.21	3.91
Electrical characteristics	Power supply		1 phase 230V (220-240V) 50Hz							
	Running current	(A)	6.51-5.97	7.26-6.66	9.74-8.93	9.74-8.93	11.72-10.74	11.72-10.74	18.09-16.58	16.70-15.31
	Power consumption	(kW)	1.39	1.55	2.10	2.10	2.50	2.50	3.90	3.60
	Power factor	(%)	97	97	98	98	97	97	98	98
Sound level Indoor unit	High/Mid./Low (Note 2)	(dB•A)	40/37/33		40/37/34		42/39/36		44/41/38	

Under Ceiling type

RAV-SM561CT-E, RAV-SM801CT-E, RAV-SM1101CT-E, RAV-SM1401CT-E
RAV-SP560AT-E, RAV-SP800AT-E, RAV-SP1100AT-E, RAV-SP1400AT-E

Indoor Unit			**RAV-SM561CT-E**		**RAV-SM801CT-E**		**RAV-SM1101CT-E**		**RAV-SM1401CT-E**	
Outdoor Unit			**RAV-SP560AT-E**		**RAV-SP800AT-E**		**RAV-SP1100AT-E**		**RAV-SP1400AT-E**	
Standard capacity (Note 1)		(kW)	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
			5.00 (2.20-5.60)	5.60 (2.20-7.00)	7.10 (2.20-8.00)	8.00 (2.20-10.00)	10.00 (3.00-12.00)	11.20 (3.00-13.00)	12.50 (3.00-14.00)	14.00 (3.00-16.50)
Energy consumption effect ratio			3.55	3.73	3.38	3.64	4.17	4.48	3.21	3.73
Electrical characteristics	Power supply		1 phase 230V (220-240V) 50Hz							
	Running current	(A)	6.61-6.06	7.03-6.44	9.74-8.93	10.20-9.35	11.24-10.31	11.72-10.74	18.09-16.58	17.39-15.94
	Power consumption	(kW)	1.41	1.50	2.10	2.20	2.40	2.50	3.90	3.75
	Power factor	(%)	97	97	98	98	97	97	98	98
Sound level Indoor unit	High/Mid./Low (Note 2)	(dB•A)	36/33/30		38/36/33		41/38/35		43/40/37	

Note 1 : The cooling capacities and electrical characteristics are measured under the conditions specified by JIS B 8616 based on the reference piping 7.5m.

Note 2 : The sound level is measured in an anechoic chamber in accordance with JIS B8616. Normally, the values measured in the actual operating environment become larger than the indicated values due to the effects of external sound.

Note : Rated conditions Cooling : Indoor air temperature 27°C DB/19°C WB, Outdoor air temperature 35°C DB
Heating : Indoor air temperature 20°C DB, Outdoor air temperature 7°C DB/6°C WB

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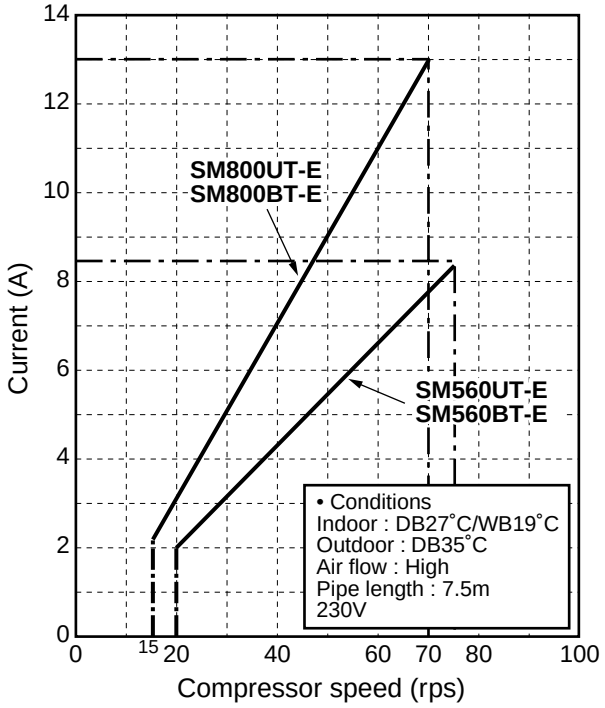
1-4. Operation Characteristic Curve

• Operation characteristic curve (A02-014)

RAV-SM560UT-E, RAV-SM560BT-E,
RAV-SM800UT-E, RAV-SM800BT-E

<Cooling>



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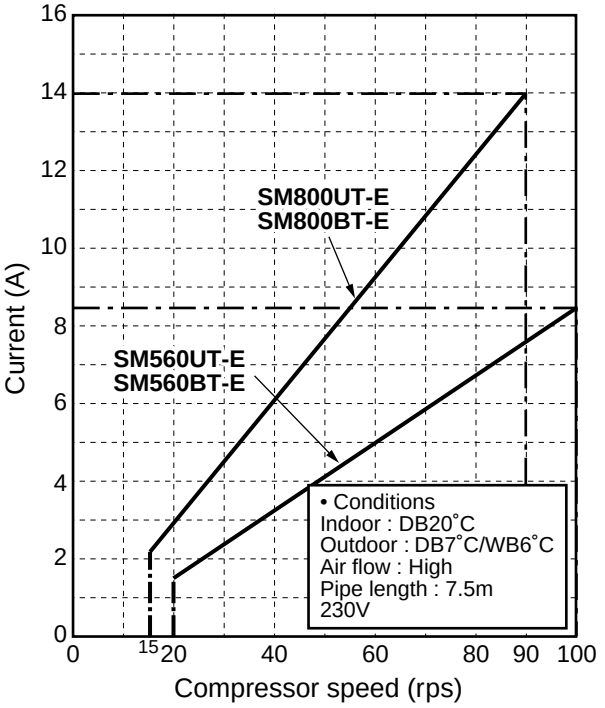

• Capacity variation ratio according to temperature (A02-014)

RAV-SM560UT-E, RAV-SM560BT-E,
RAV-SM800UT-E, RAV-SM800BT-E

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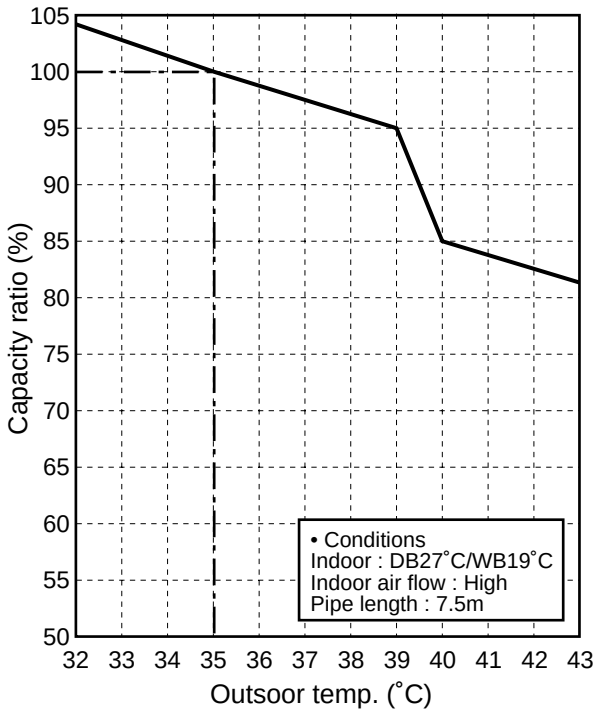

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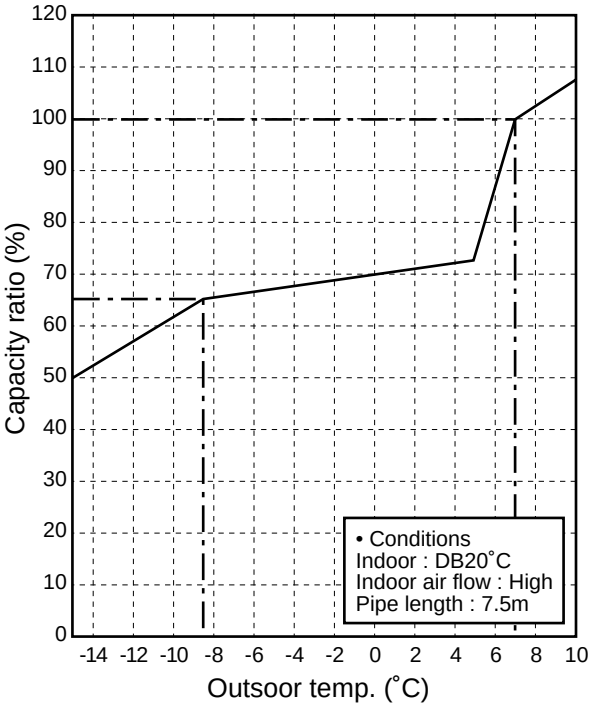

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

• Operation characteristic curve (A03-007)

RAV-SM561BT-E, RAV-SM801BT-E

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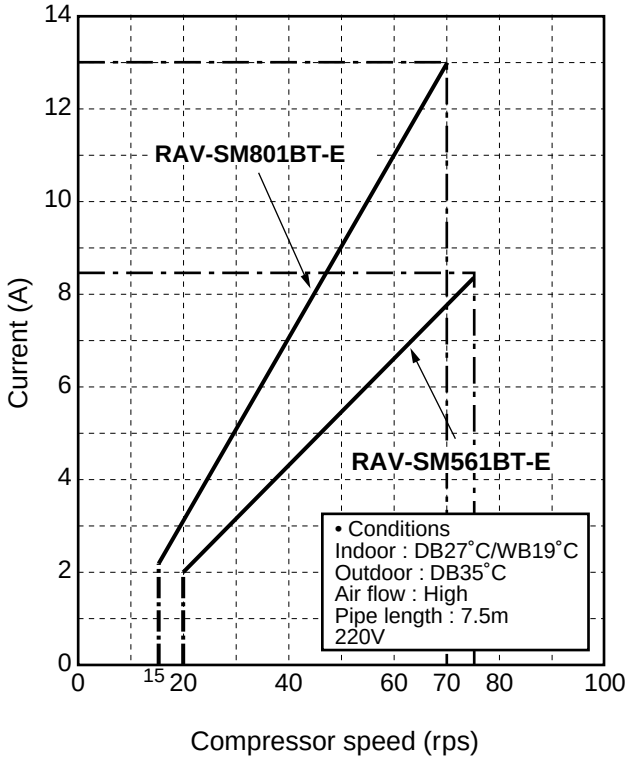

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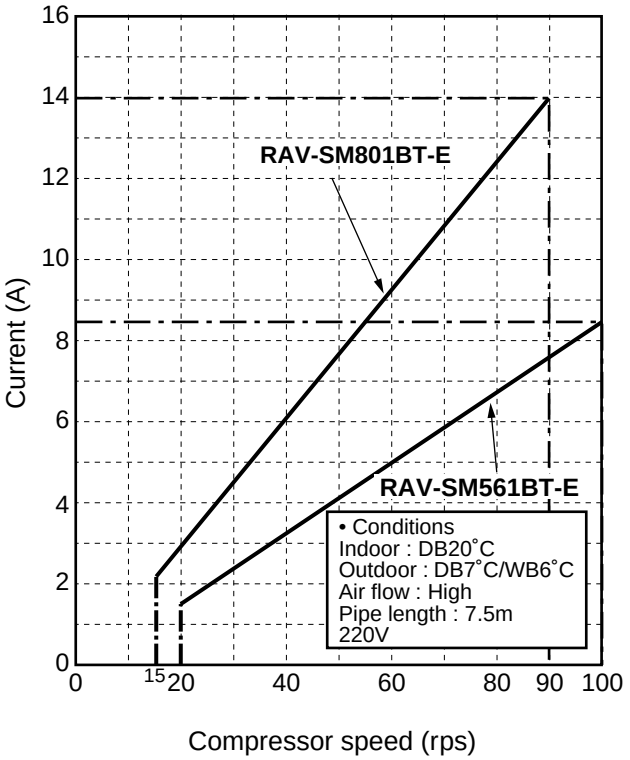

RAV-SM1101BT-E

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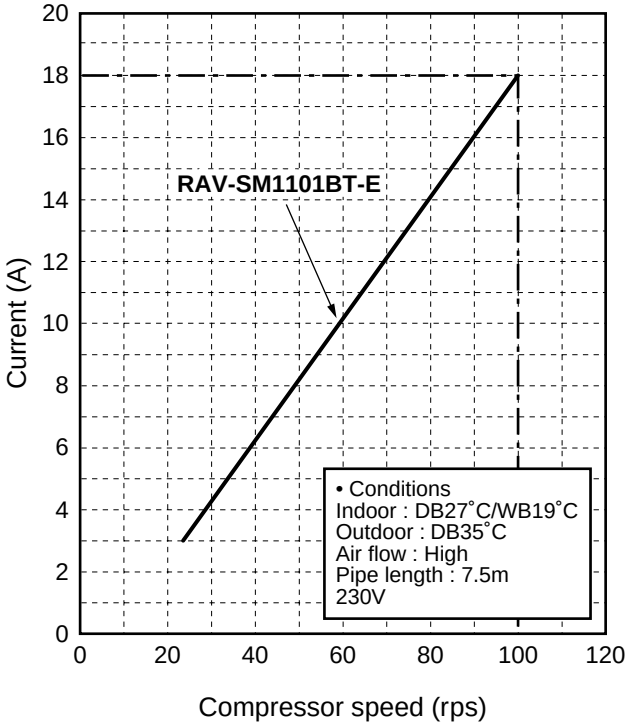

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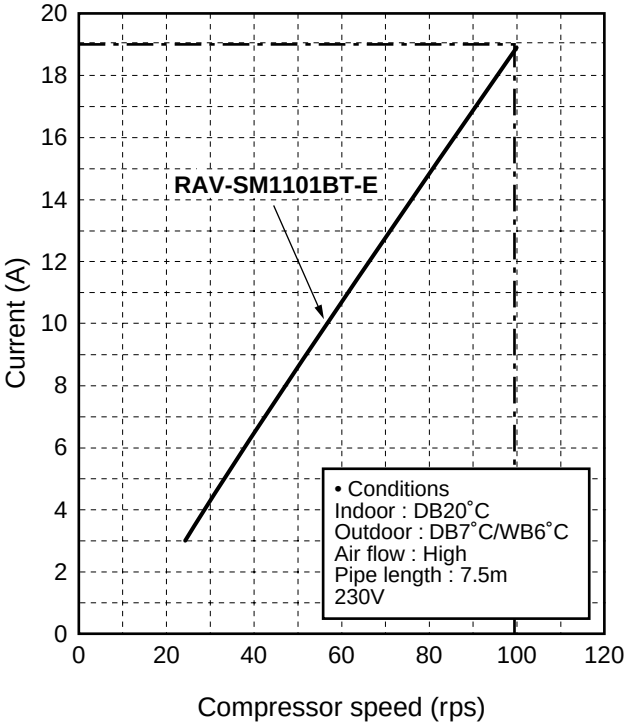

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

• Operation characteristic curve (A03-003)

RAV-SM1100UT-E

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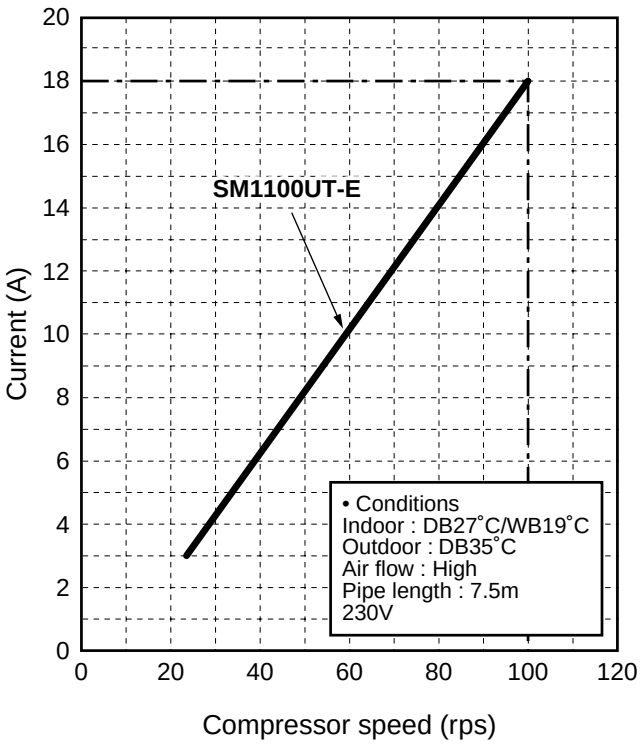

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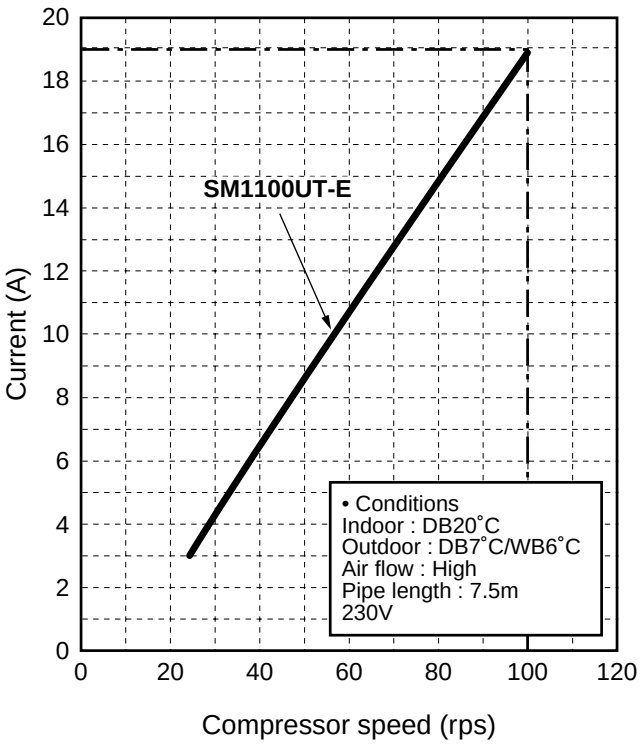

RAV-SM1400UT-E

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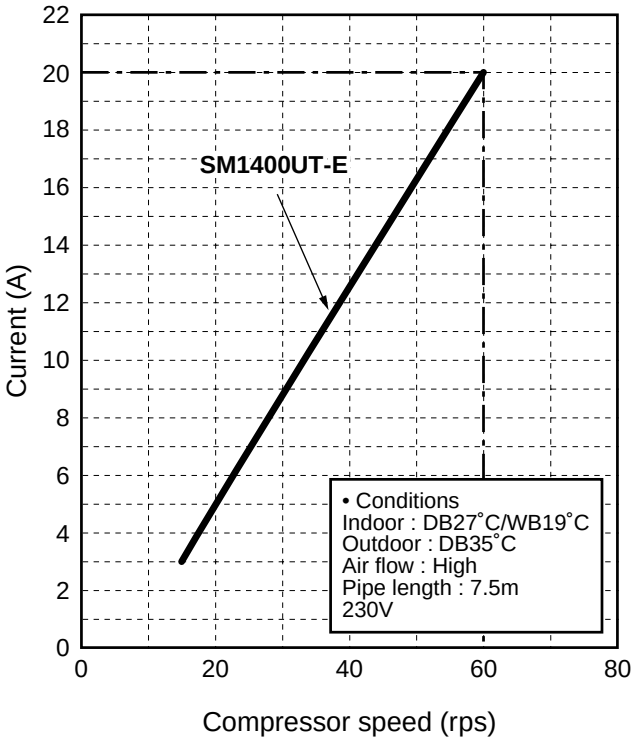

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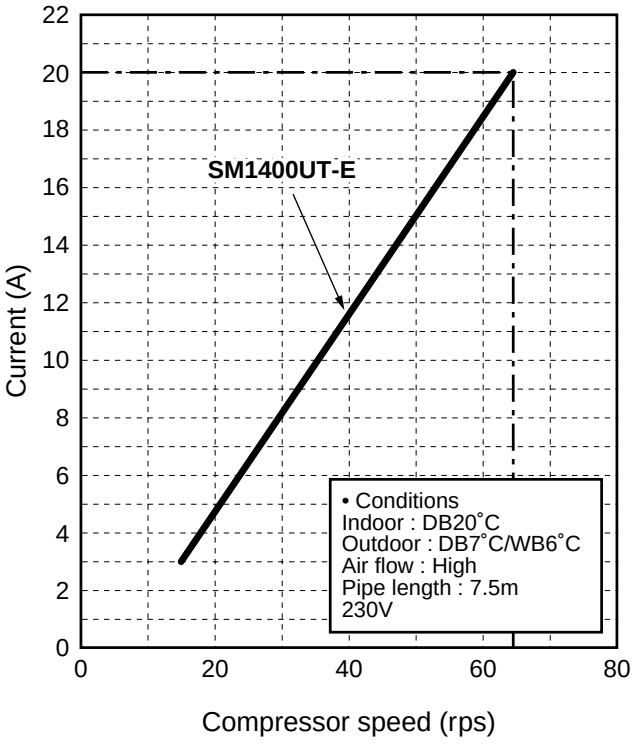

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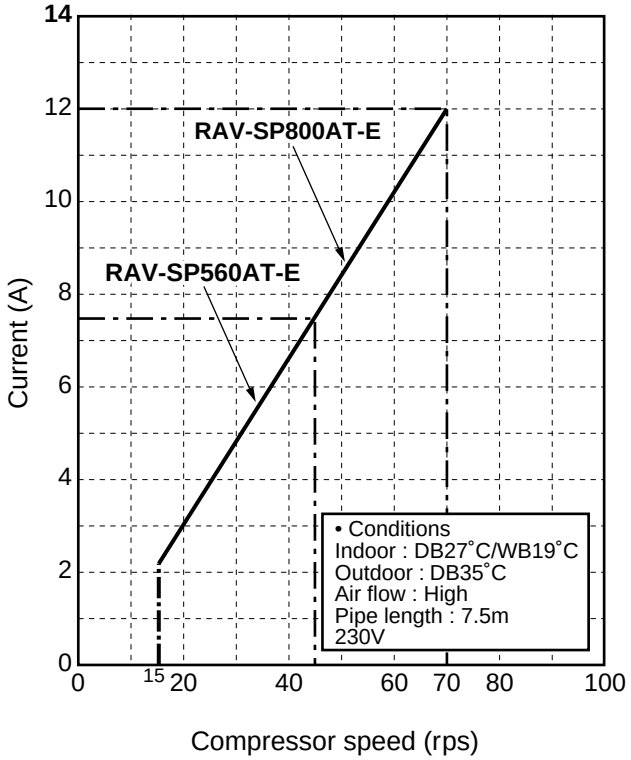
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

• Operation characteristic curve (A03-014)

RAV-SP560AT-E, RAV-SP800AT-E

<Cooling>



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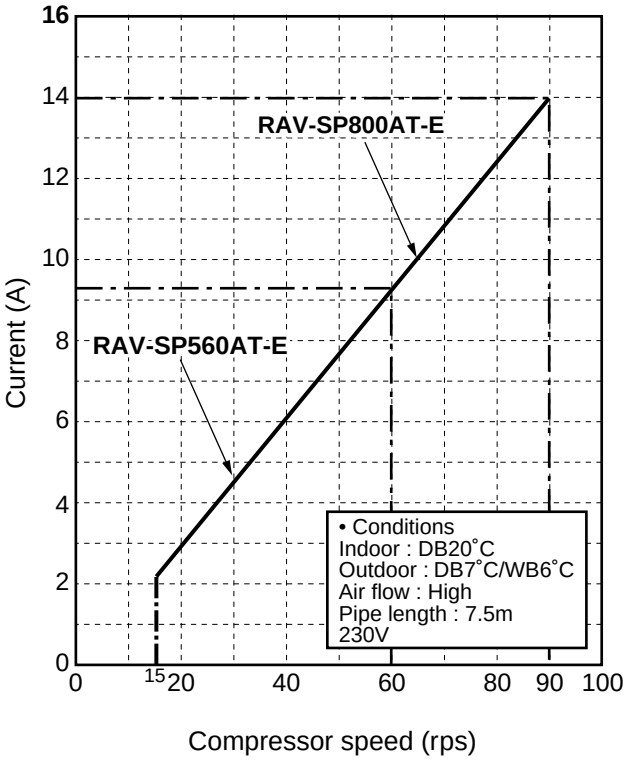
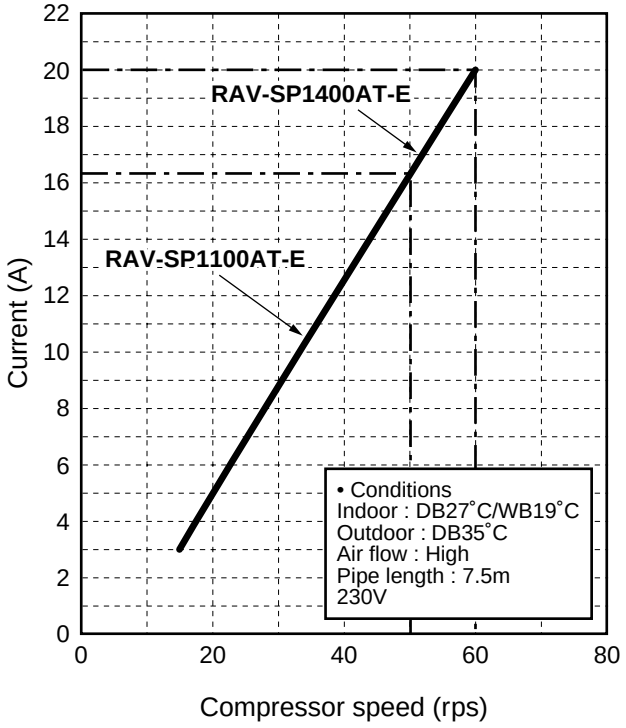


RAV-SP1100AT-E, RAV-SP1400AT-E

<Cooling>



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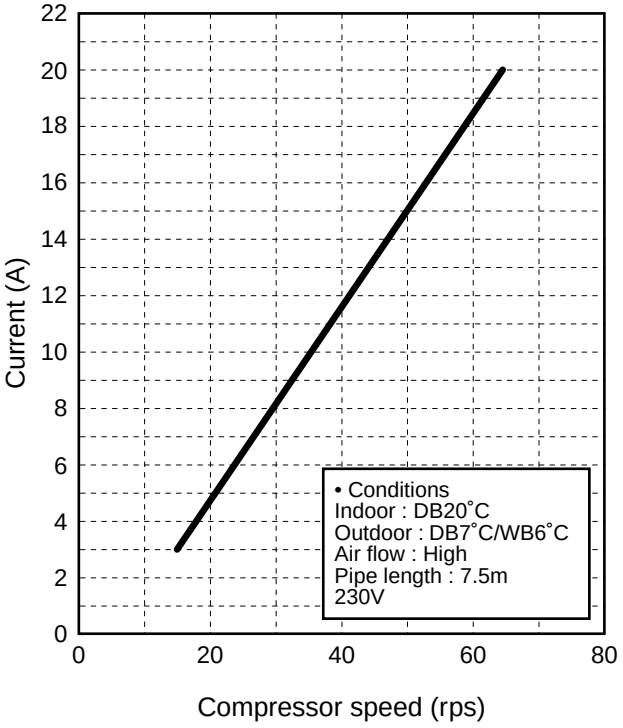

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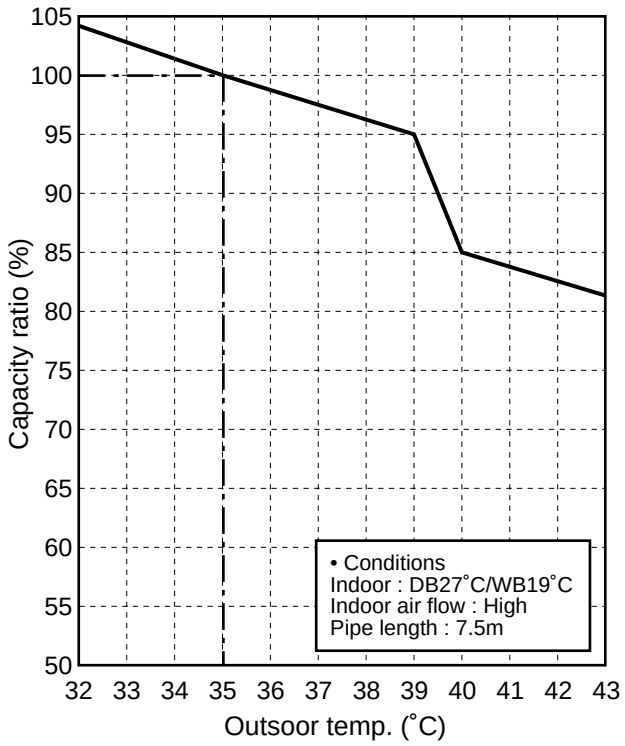
• Capacity variation ratio according to temperature (A03-014)

RAV-SP560AT-E, RAV-SP800AT-E, RAV-SP1100AT-E, RAV-SP1400AT-E

<Cooling>



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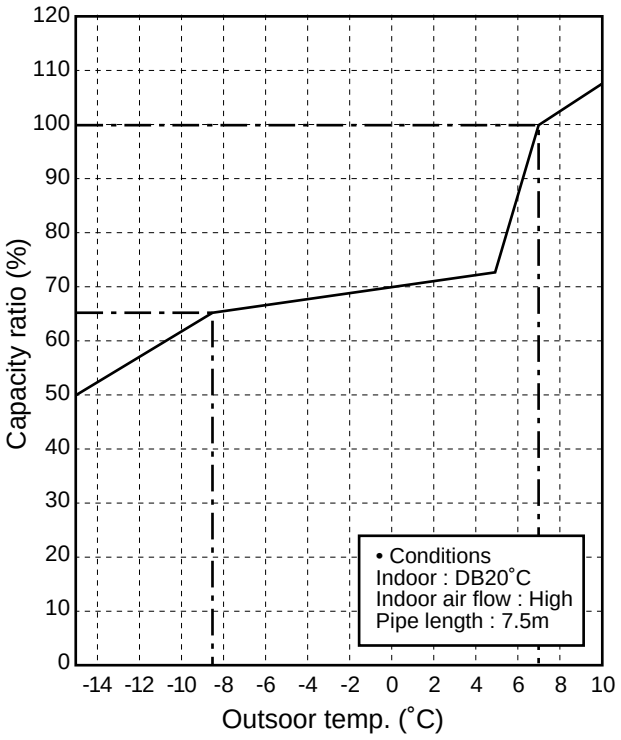
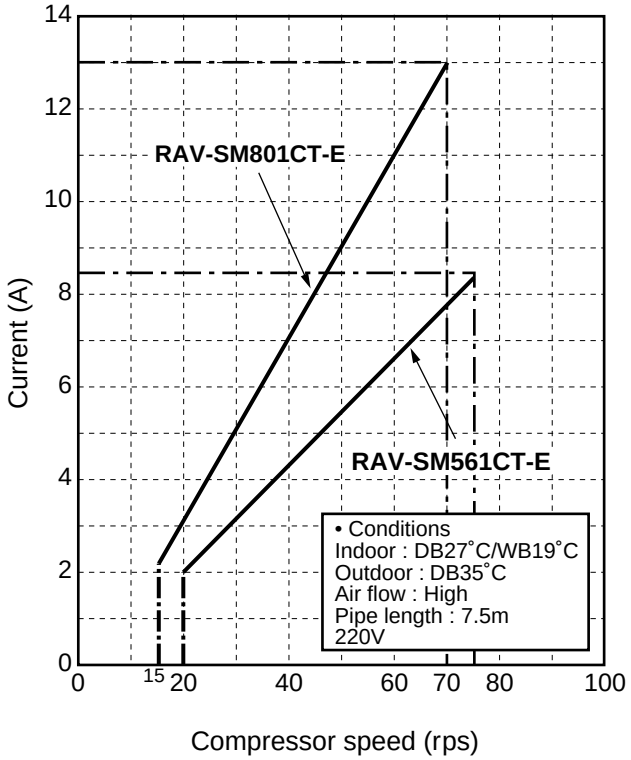


Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

• Operation characteristic curve (A03-016)

RAV-SM561CT-E, RAV-SM801CT-E

<Cooling>



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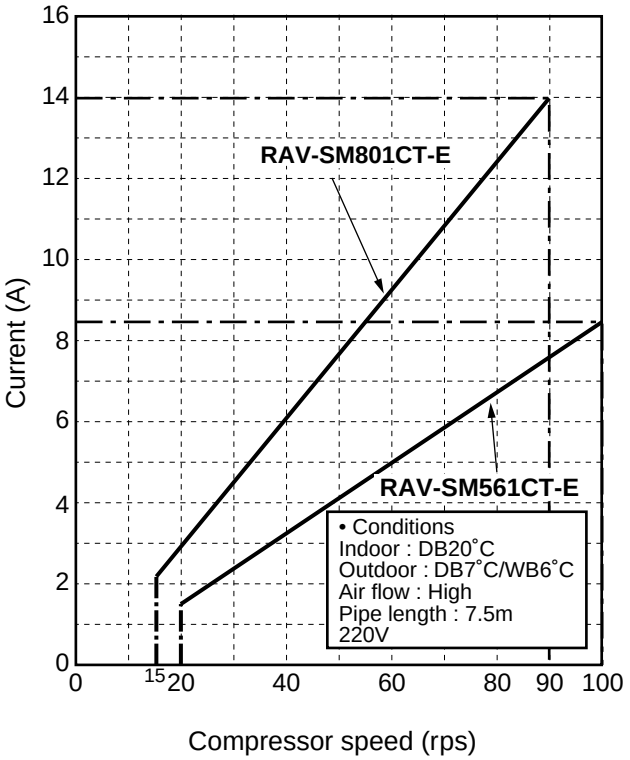
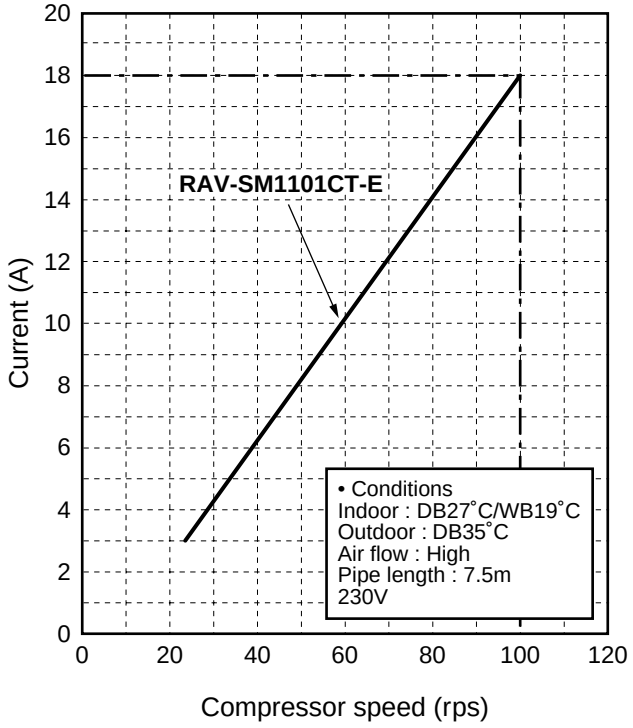


RAV-SM1101CT-E

<Cooling>



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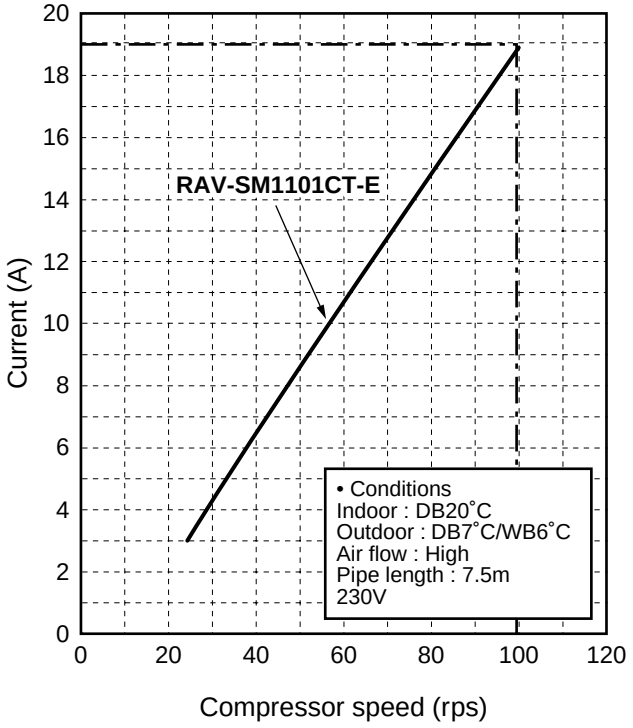

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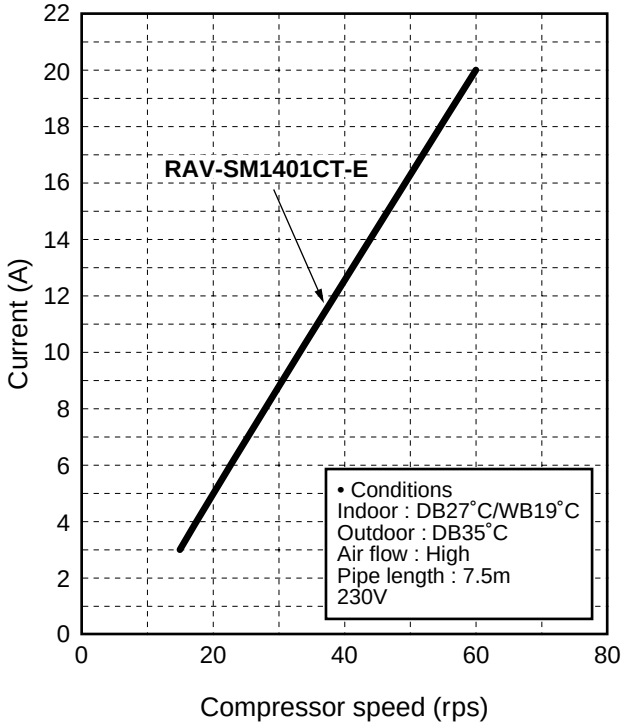
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

• Operation characteristic curve (A03-016)

RAV-SM1401CT-E

<Cooling>



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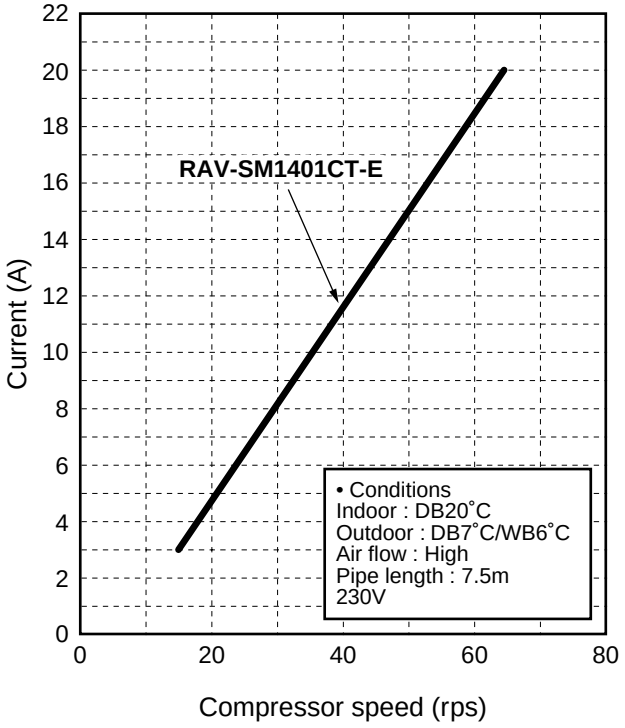
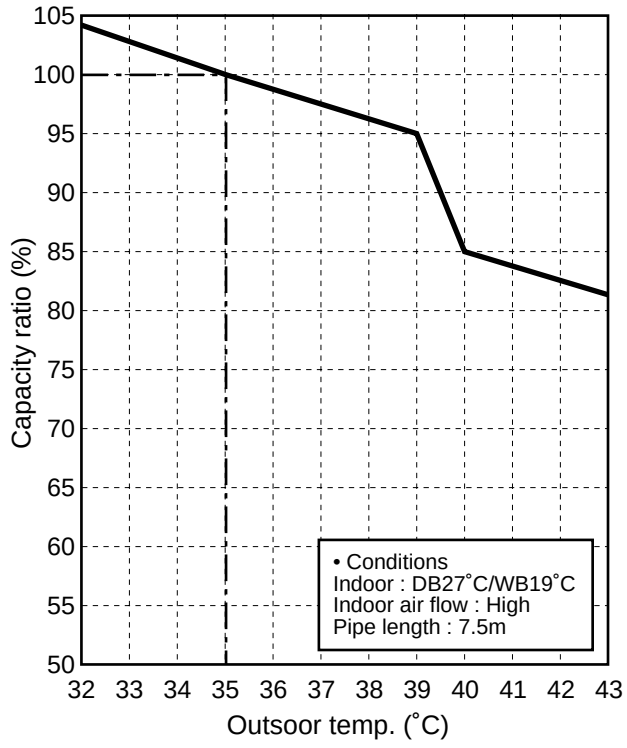


• Capacity variation ratio according to temperature (A03-016)

RAV-SM1401CT-E

<Cooling>



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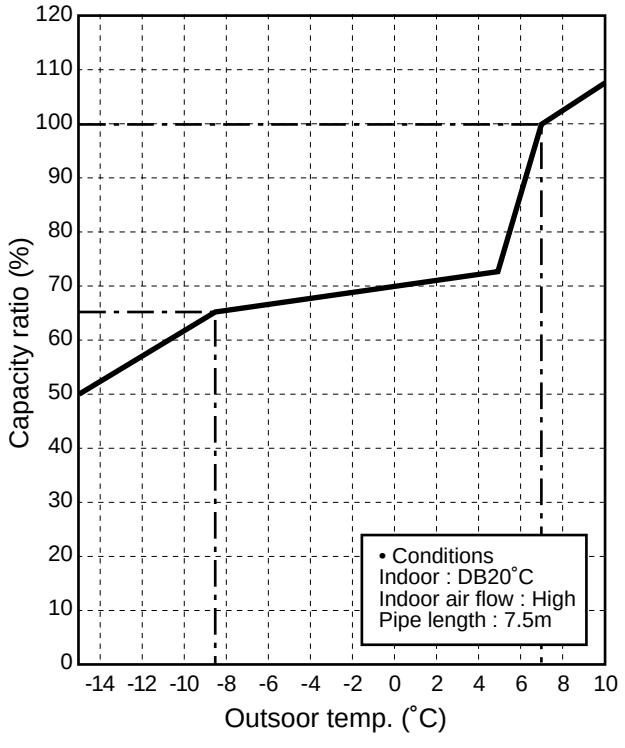

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

2. AIR DUCTING WORK

2-1. Static Pressure Characteristics of Each Model

RAV-SM560BT-E, RAV-SM800BT-E (A02-014)

Fig. 1 RAV-SM560BT-E

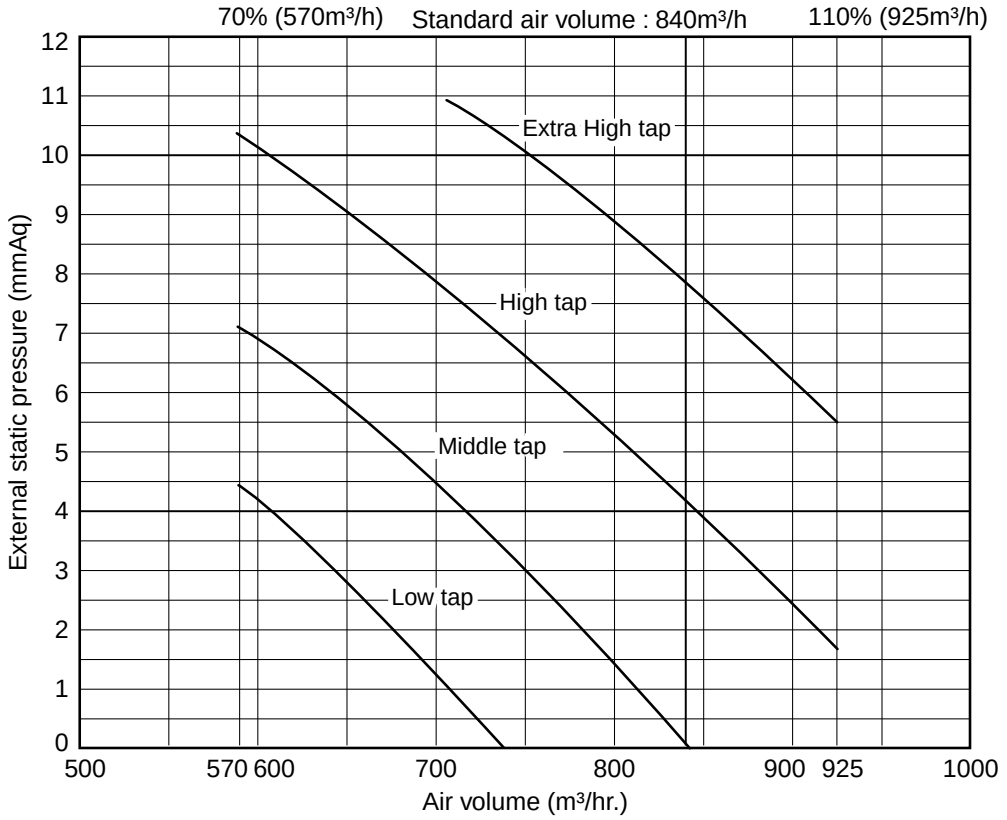
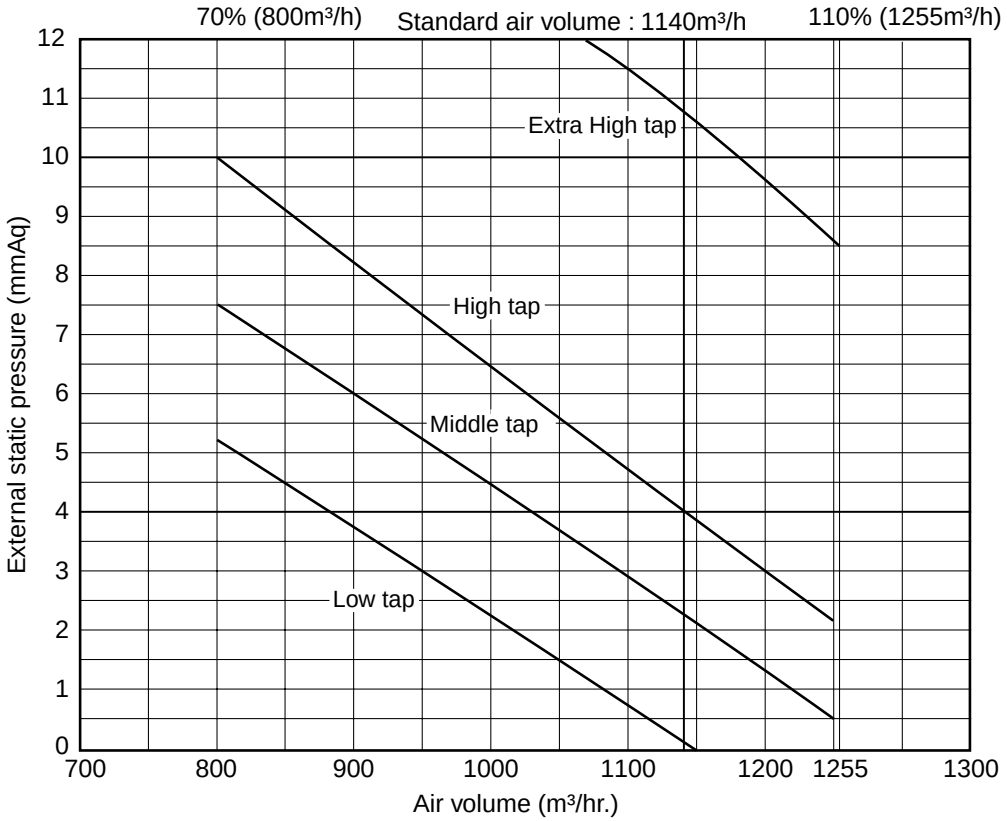


Fig. 2 RAV-SM800BT-E



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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM561BT-E, RAV-SM801BT-E, RAV-SM1101BT-E, RAV-SM1401BT-E (A03-007)

Fig. 1 RAV-SM561BT-E (Round duct)

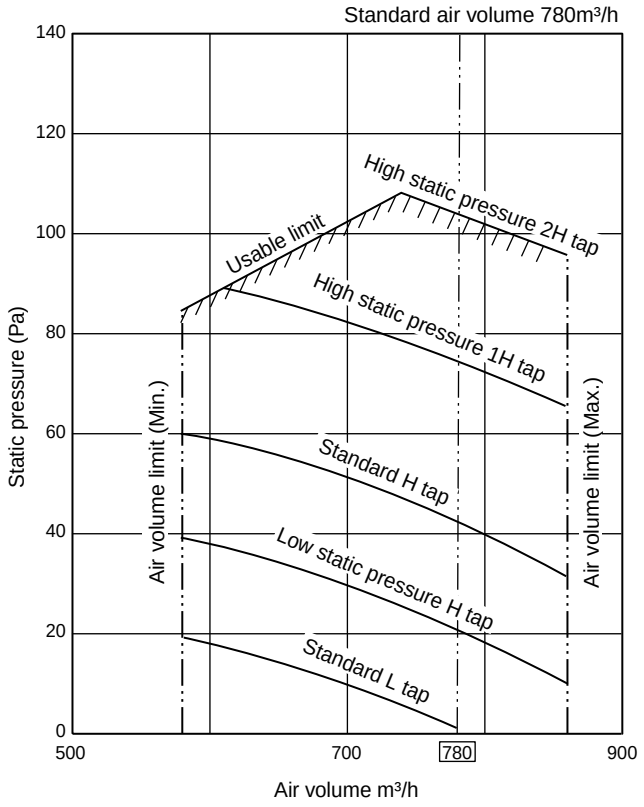


Fig. 2 RAV-SM561BT-E (Square duct)

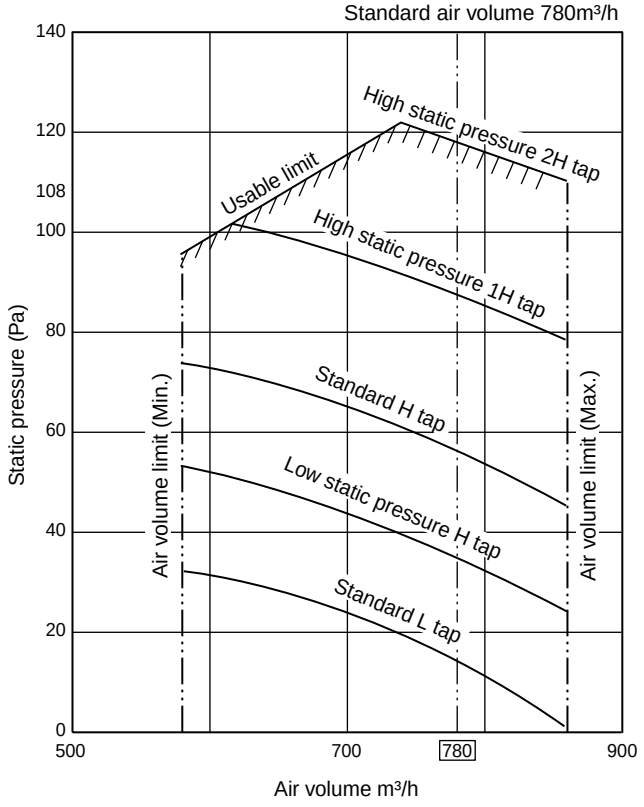


Fig. 3 RAV-SM801BT-E (Round duct)

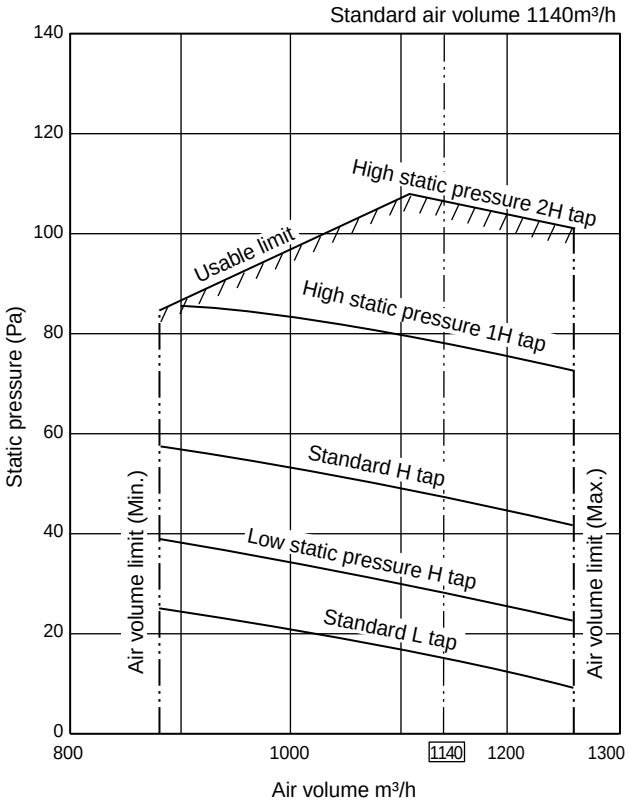
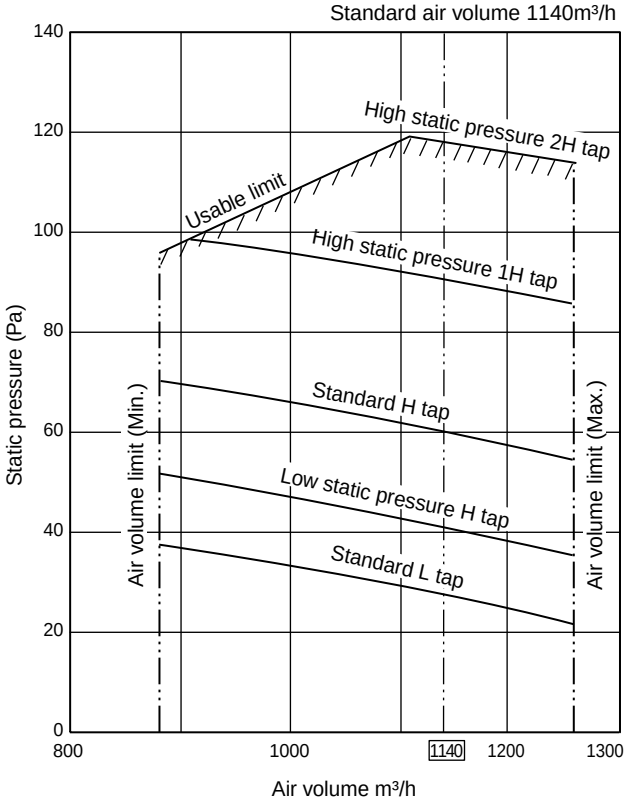


Fig. 4 RAV-SM801BT-E (Square duct)



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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

Fig. 5 RAV-SM1101BT-E (Round duct)

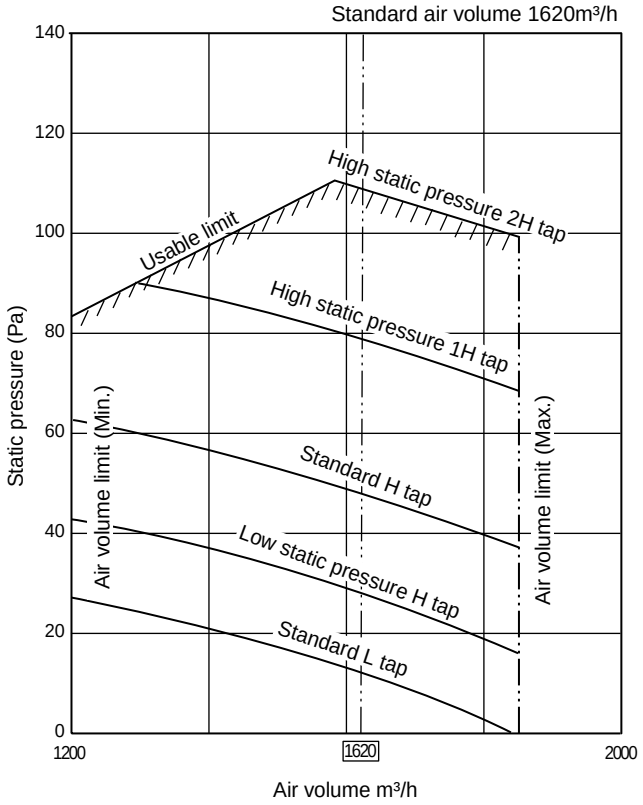


Fig. 6 RAV-SM1101BT-E (Square duct)

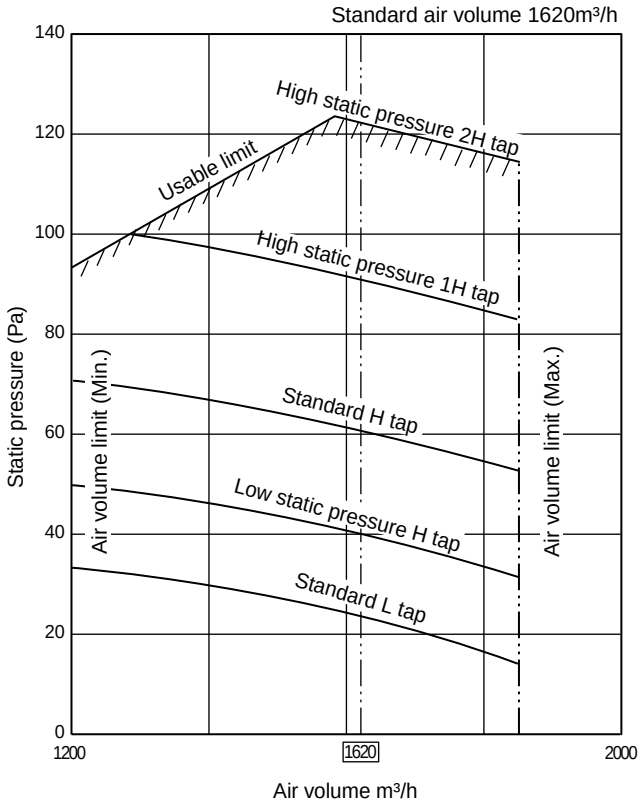


Fig. 7 RAV-SM1401BT-E (Round duct)

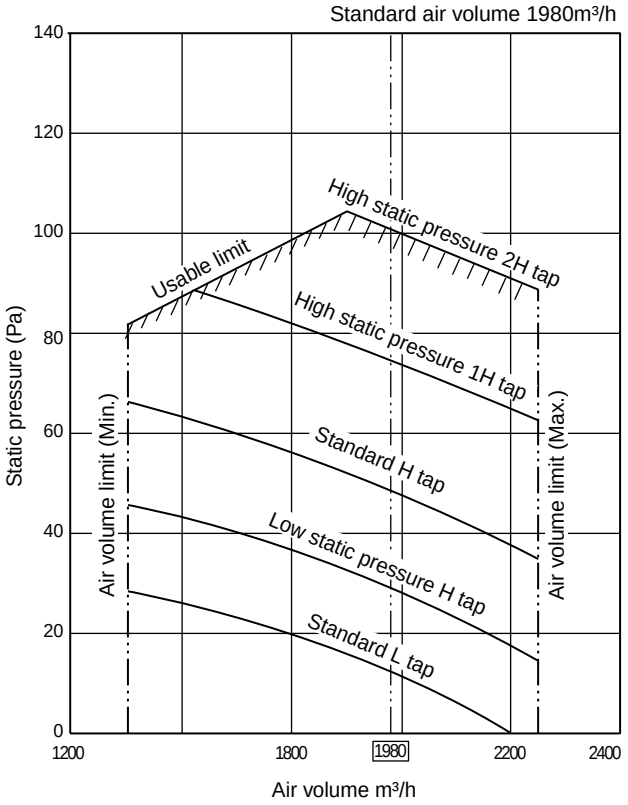
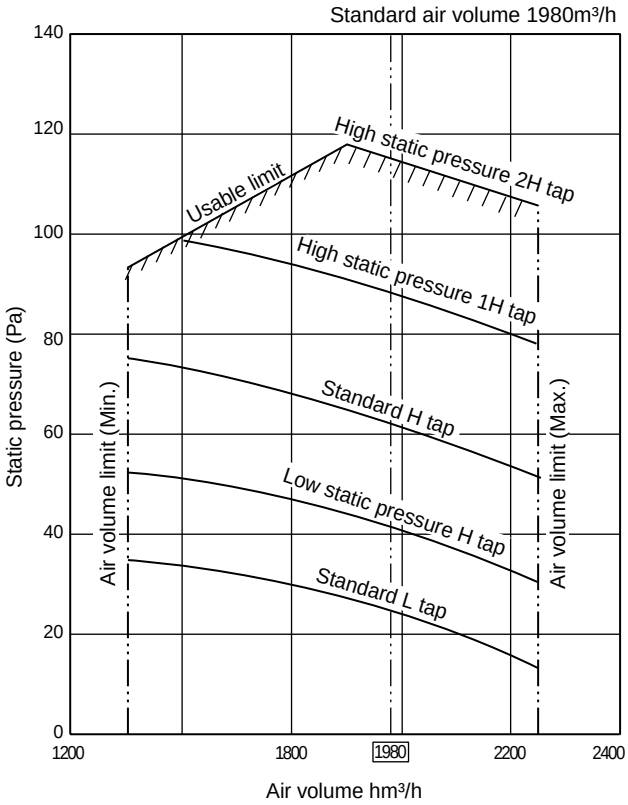


Fig. 8 RAV-SM1401BT-E (Square duct)



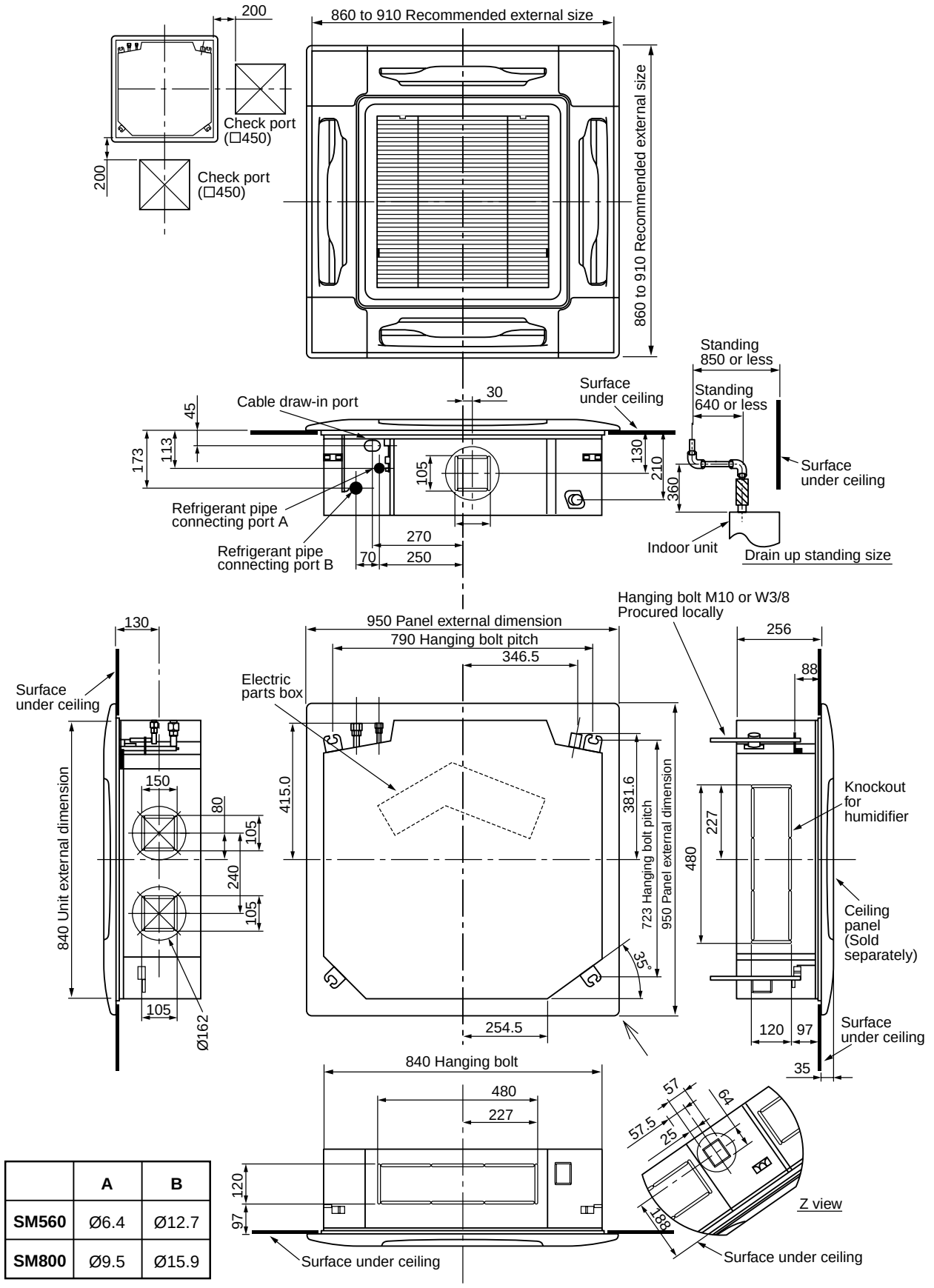
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

3. CONSTRUCTION VIEWS (EXTERNAL VIEWS)

3-1. Indoor Unit

3-1-1. 4-Way Air Discharge Cassette Type

RAV-SM560UT-E, RAV-SM800UT-E (A02-014)



	A	B
SM560	Ø6.4	Ø12.7
SM800	Ø9.5	Ø15.9

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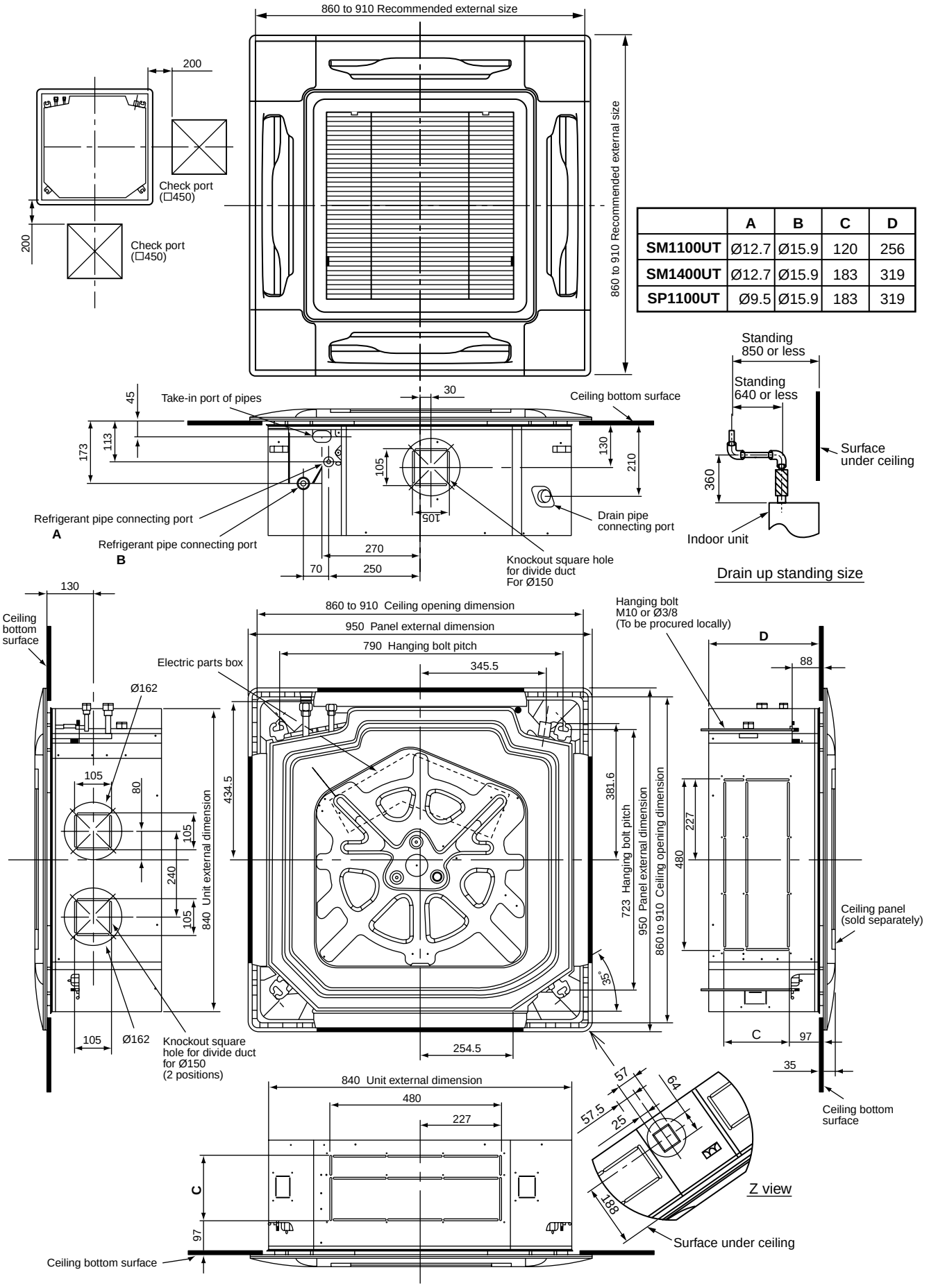
RAV-SM1100UT-E, RAV-SM1400UT-E (A03-003), RAV-SP1100UT-E (A03-014)

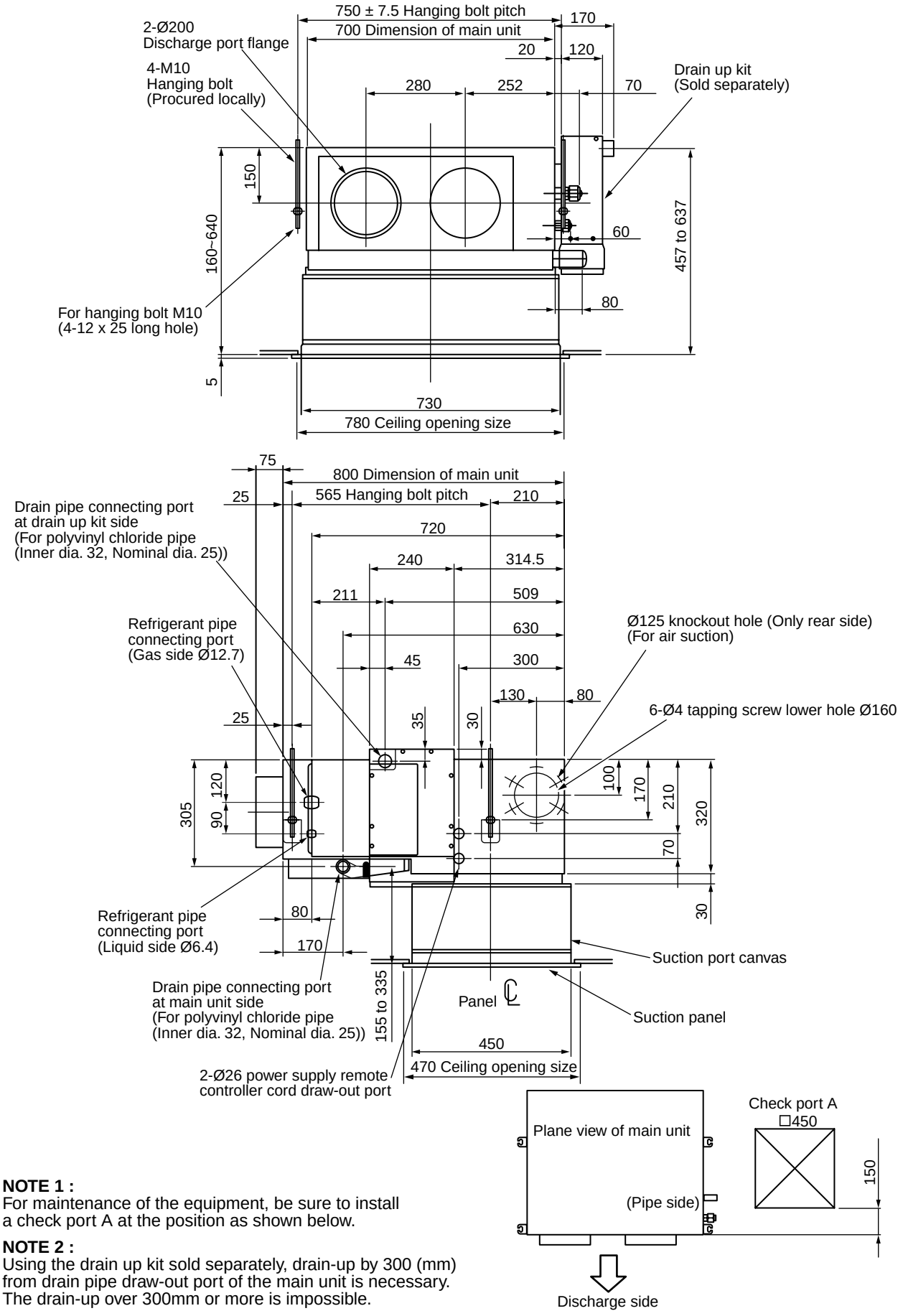


	A	B	C	D
SM1100UT	Ø12.7	Ø15.9	120	256
SM1400UT	Ø12.7	Ø15.9	183	319
SP1100UT	Ø9.5	Ø15.9	183	319

Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

3-1-2. Concealed Duct Type

RAV-SM560BT-E (A02-014)



NOTE 1 :
For maintenance of the equipment, be sure to install a check port A at the position as shown below.

NOTE 2 :
Using the drain up kit sold separately, drain-up by 300 (mm) from drain pipe draw-out port of the main unit is necessary. The drain-up over 300mm or more is impossible.

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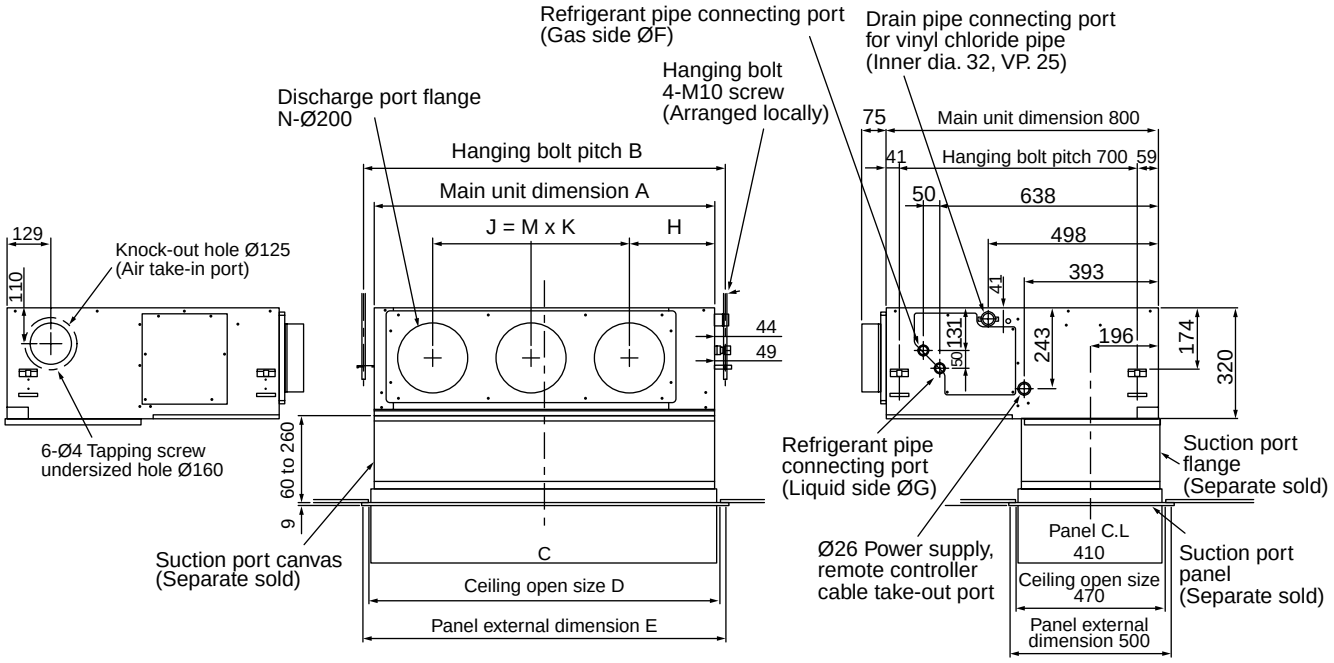
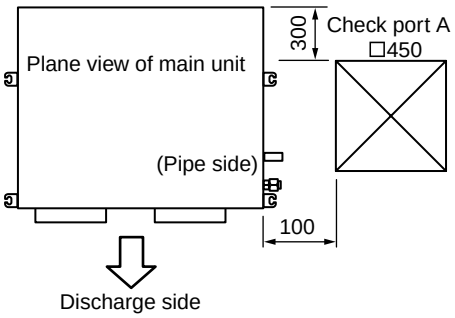
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM561BT-E, RAV-SM800BT-E, RAV-SM801BT-E, RAV-SM1101BT-E, RAV-SM1401BT-E (A03-007)



- **Dimension**

	A	B	C	D	E	F	G	H	J	K	M	N	O
RAV-SM561BT	700	766	690	750	780	12.7	6.4	252	280	280	1	2	410
RAV-SM800BT	1000	1050	1030	1030	1050	12.7	6.4	252	580	290	2	3	450
RAV-SM801BT	1000	1066	990	1050	1080	15.9	9.5	252	580	290	2	3	410
RAV-SM1101BT **RAV-SM1401BT**	1350	1416	1340	1400	1430	15.9	9.5	252	930	310	2	4	410



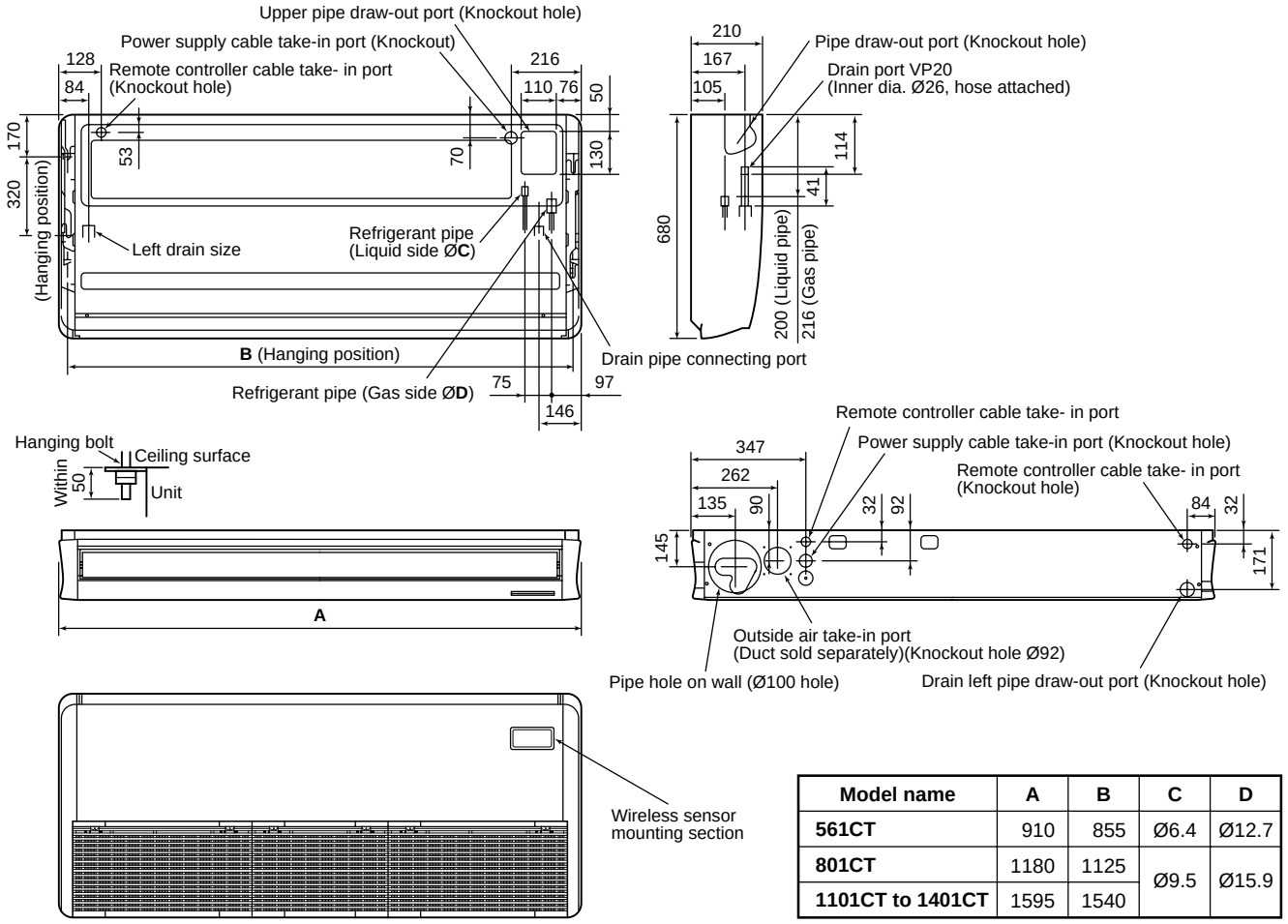
NOTE 1 :
For maintenance of the equipment, be sure to install a check port A at the position as shown below.

NOTE 2 :
Using the drain up kit sold separately, drain-up by 300 (mm) from drain pipe draw-out port of the main unit is necessary. The drain-up over 300mm or more is impossible.

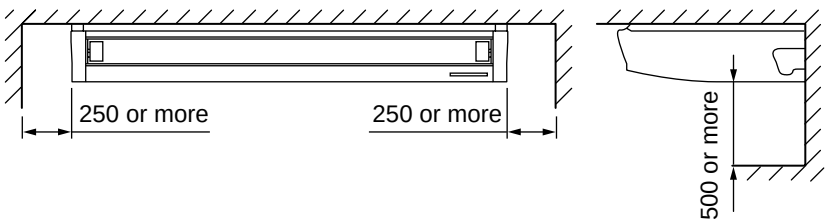
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

3-1-3. Under Ceiling Type

RAV-SM561CT-E, RAV-SM801CT-E, RAV-SM1101CT-E, RAV-SM1401CT-E (A03-016)


Upper pipe draw-out port (Knockout hole)
Power supply cable take-in port (Knockout)
Remote controller cable take- in port (Knockout hole)
Left drain size
Refrigerant pipe (Liquid side ØC)
Refrigerant pipe (Gas side ØD)
B (Hanging position)
Drain pipe connecting port
Pipe draw-out port (Knockout hole)
Drain port VP20 (Inner dia. Ø26, hose attached)
200 (Liquid pipe)
216 (Gas pipe)
Hanging bolt
Ceiling surface
Unit
Within
A
Remote controller cable take- in port
Power supply cable take-in port (Knockout hole)
Remote controller cable take- in port (Knockout hole)
Outside air take-in port (Duct sold separately)(Knockout hole Ø92)
Pipe hole on wall (Ø100 hole)
Drain left pipe draw-out port (Knockout hole)
Wireless sensor mounting section

Model name	A	B	C	D
561CT	910	855	Ø6.4	Ø12.7
801CT	1180	1125	Ø9.5	Ø15.9
1101CT to 1401CT	1595	1540		



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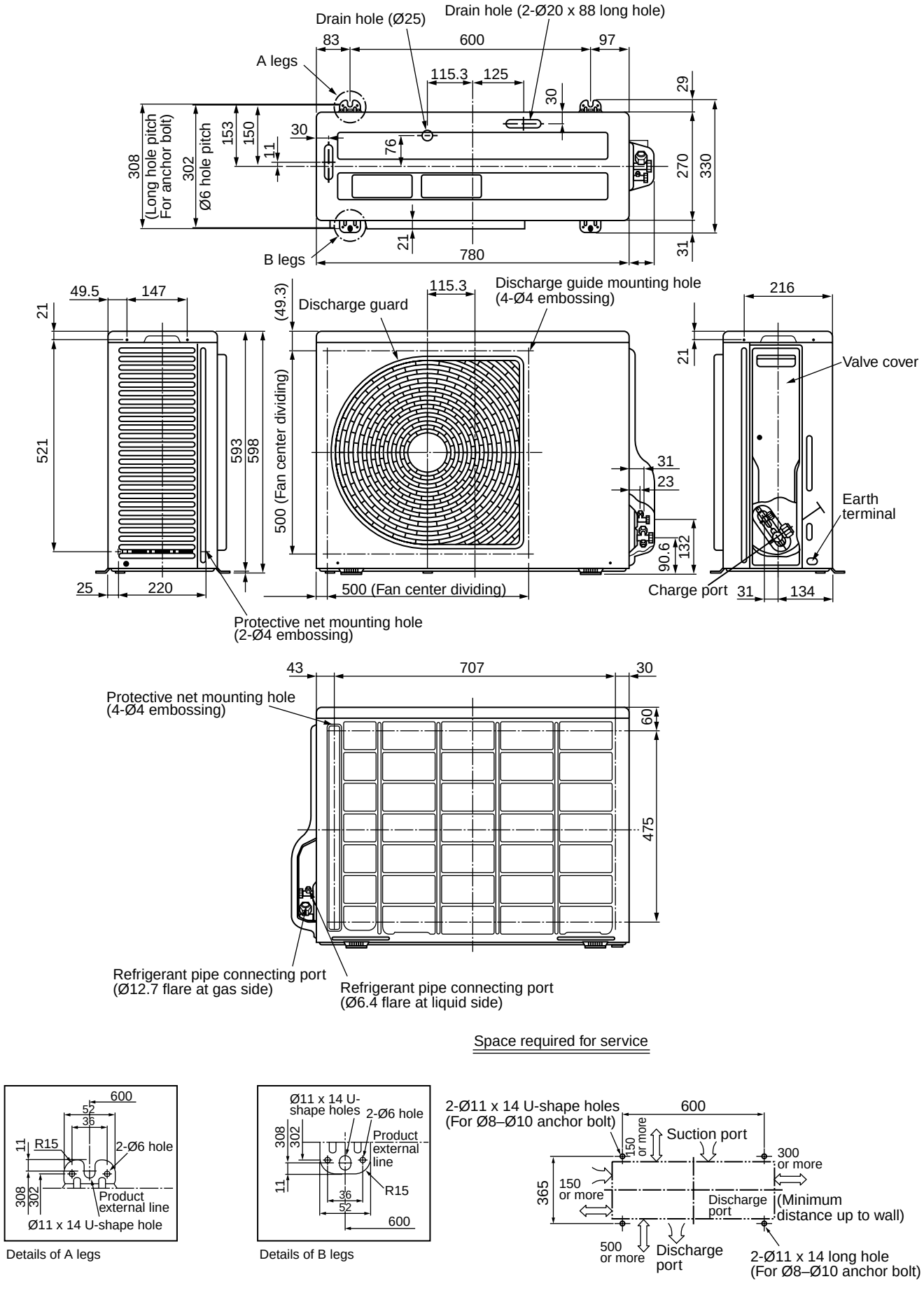
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

3-2. Outdoor Unit

RAV-SM560AT-E (A02-014)



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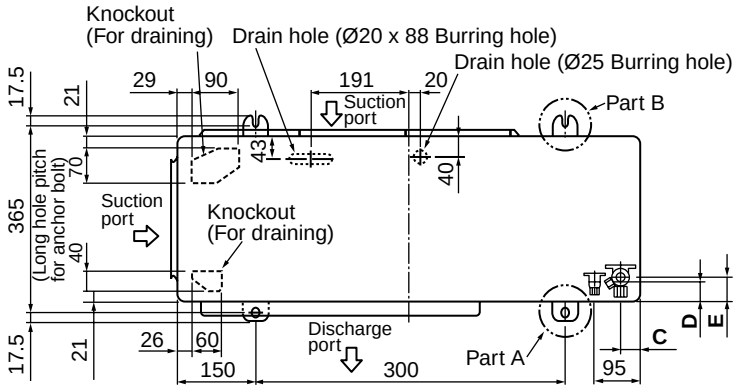
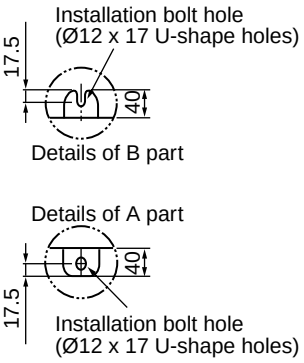
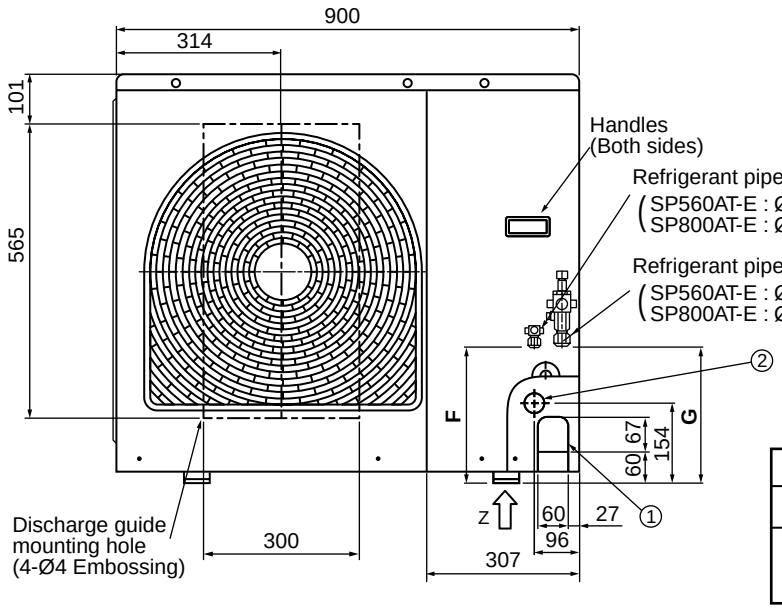
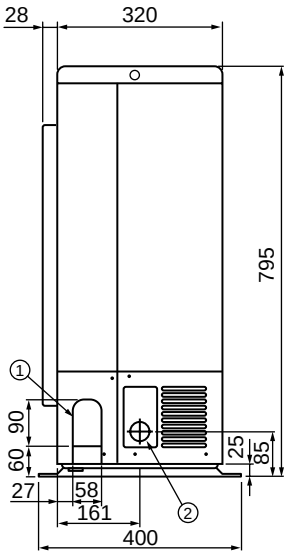
RAV-SM800AT-E (A02-014), RAV-SP560AT-E, RAV-SP800AT-E (A03-014)

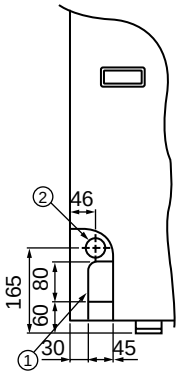


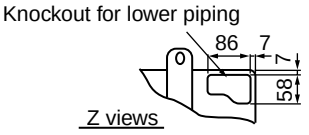




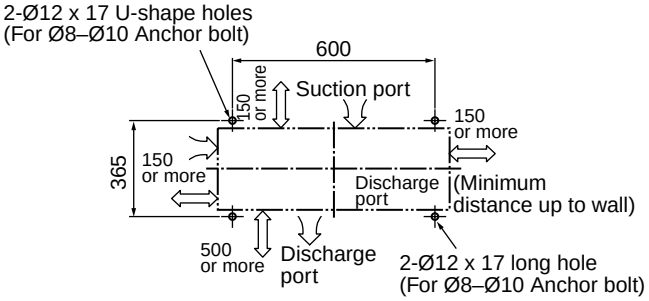
	C	D	E	F	G
SP560	36	42	54	282	269
SM800 SP800	43	39	47	264	264



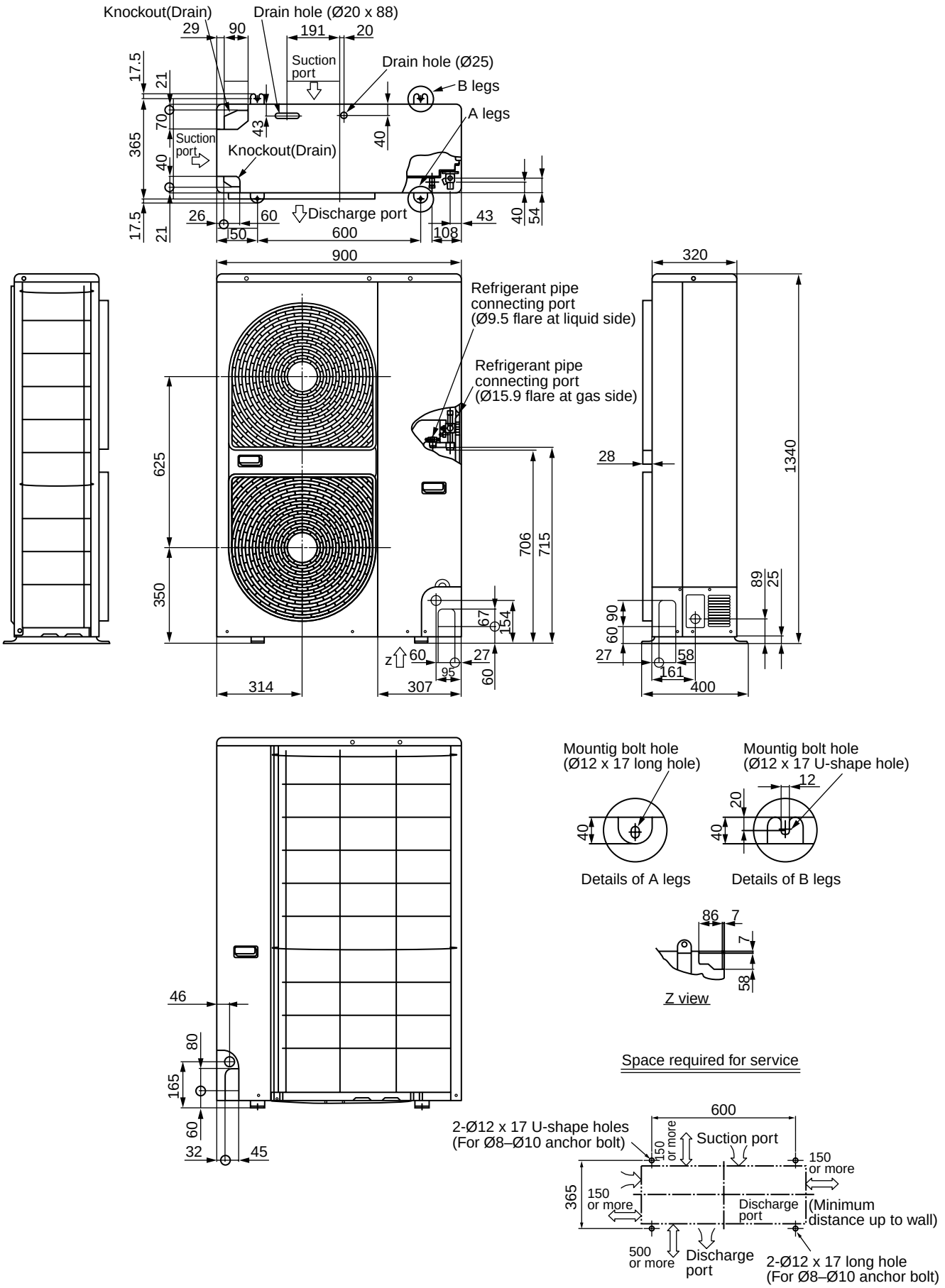




Space required for service



RAV-SM1100AT-E, RAV-SM1400AT-E (A03-003), RAV-SP1100AT-E, RAV-SP1400AT-E (A03-014)


Knockout(Drain)
Drain hole (Ø20 x 88)
Suction port
Drain hole (Ø25)
B legs
A legs
Knockout(Drain)
Discharge port
Refrigerant pipe connecting port (Ø9.5 flare at liquid side)
Refrigerant pipe connecting port (Ø15.9 flare at gas side)
Mountig bolt hole (Ø12 x 17 long hole)
Mountig bolt hole (Ø12 x 17 U-shape hole)
Details of A legs
Details of B legs
Z view
Space required for service
2-Ø12 x 17 U-shape holes (For Ø8–Ø10 anchor bolt)
Suction port
Discharge port
(Minimum distance up to wall)
2-Ø12 x 17 long hole (For Ø8–Ø10 anchor bolt)

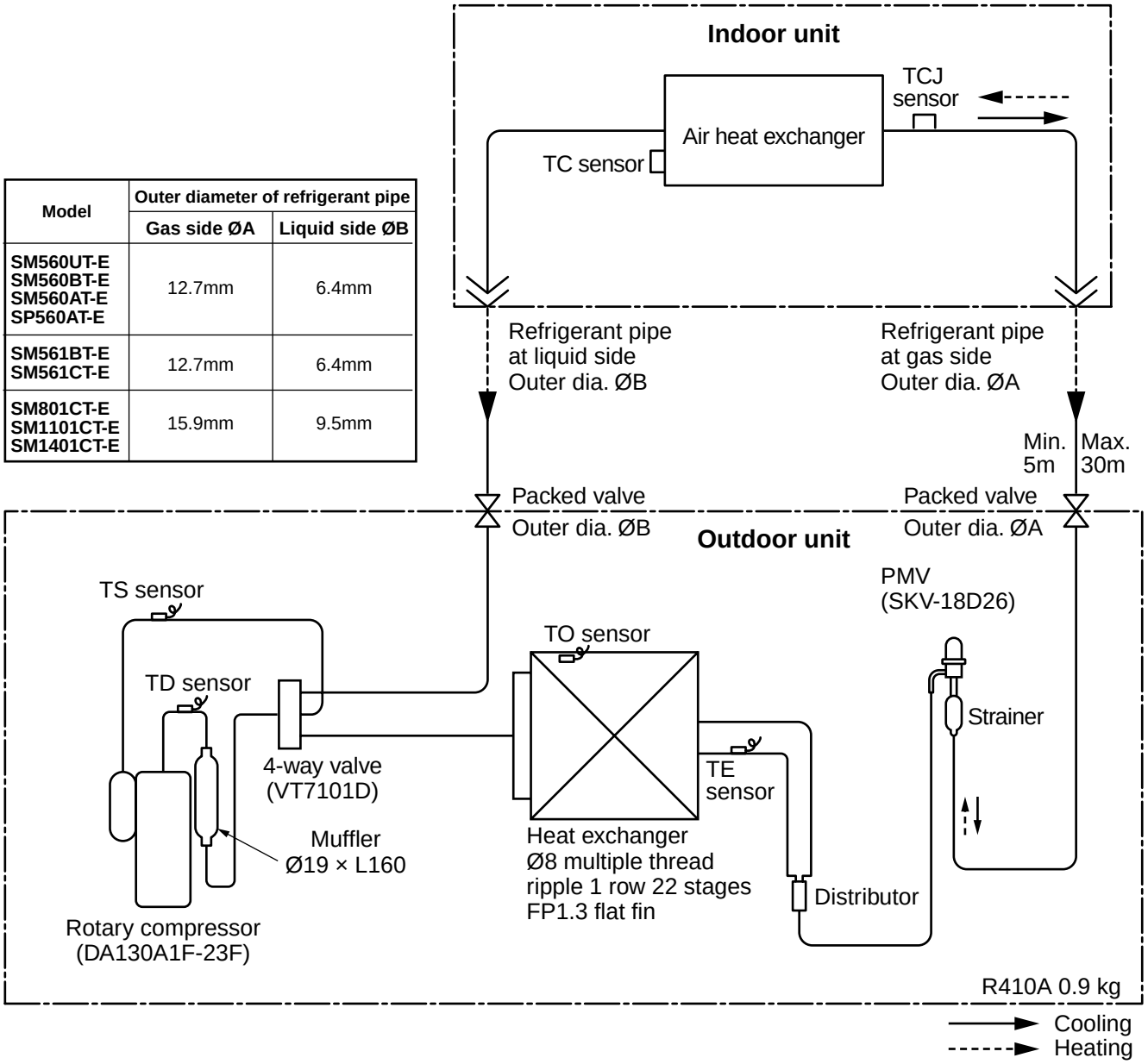
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

4. SYSTEMATIC REFRIGERATING CYCLE DIAGRAM

4-1. Indoor Unit/Outdoor Unit

RAV-SM560UT-E, RAV-SM560BT-E, RAV-SM561BT-E, RAV-SM560KRT-E, RAV-SP560AT-E, RAV-SM561CT-E, RAV-SM801CT-E, RAV-SM1101CT-E, RAV-SM1401CT-E, RAV-SM560AT-E (A02-014, A03-014, A03-016)

Model	Outer diameter of refrigerant pipe	
	Gas side ØA	Liquid side ØB
SM560UT-E SM560BT-E SM560AT-E SP560AT-E	12.7mm	6.4mm
SM561BT-E SM561CT-E	12.7mm	6.4mm
SM801CT-E SM1101CT-E SM1401CT-E	15.9mm	9.5mm



		Pressure				Pipe surface temperature (°C)				Compressor revolutions per second (rps) *	Indoor fan	Indoor/Outdoor temp. conditions (DB/WB) (°C)	
		(MPa)		(kg/cm²G)		Discharge	Suction	Indoor heat exchanger	Outdoor heat exchanger			Indoor	Outdoor
		Pd	Ps	Pd	Ps	(TD)	(TS)	(TC)	(TE)				
Cooling	Standard	3.1	0.9	31.9	8.9	85	15	10	50	74	HIGH	27/19	35/–
	Overload	3.6	1.0	37.1	10.4	93	20	15	57	72	HIGH	32/24	43/–
	Low load	0.9	0.7	9.1	7.1	20	7	3	5	28	LOW	18/15.5	–5/–
Heating	Standard	2.3	0.6	23.6	6.2	71	1	39	3	84	HIGH	20/–	7/6
	Overload	3.3	1.2	33.2	11.8	78	20	54	19	47	LOW	30/–	24/18
	Low load	1.7	0.2	16.4	1.8	110	–20	26	–22	110	HIGH	15/–	–20/(70%)

* 4 poles are provided to this compressor.

The compressor frequency (Hz) measured with a clamp meter is 2 times of revolutions (rps) of the compressor.

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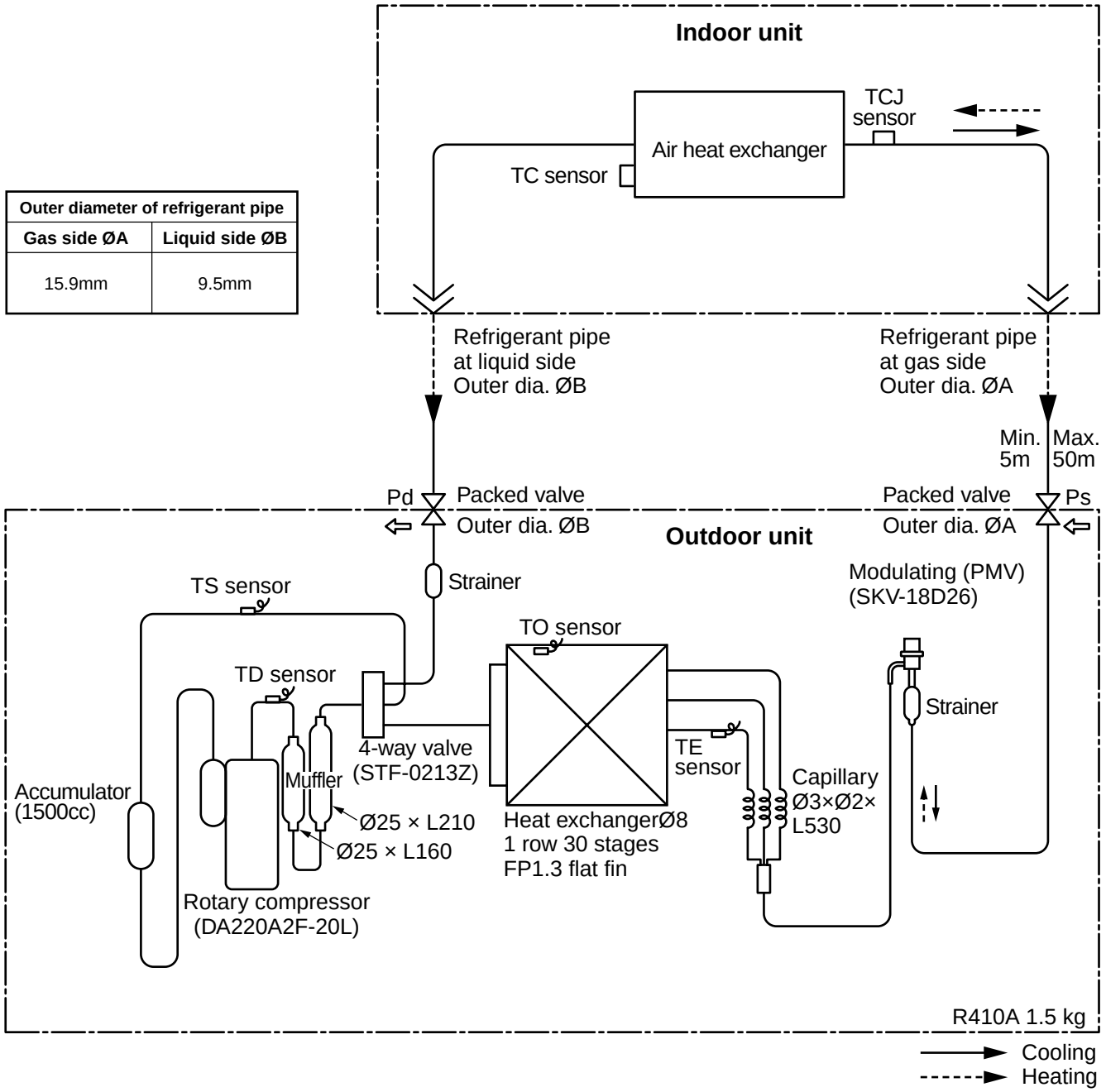
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM800UT-E, RAV-SM800BT-E, RAV-SM801BT-E, RAV-SM800AT-E, RAV-SM800KRT-E, RAV-SP800AT-E (A02-014, A03-007, A03-014)

Outer diameter of refrigerant pipe	
Gas side ØA	**Liquid side ØB**
15.9mm	9.5mm



		Pressure				Pipe surface temperature (°C)				Compressor revolutions per second (rps) *	Indoor fan	Indoor/Outdoor temp. conditions (DB/WB) (°C)	
		(MPa)		(kg/cm²G)		Discharge	Suction	Indoor heat exchanger	Outdoor heat exchanger				
		Pd	Ps	Pd	Ps	(TD)	(TS)	(TC)	(TE)			Indoor	Outdoor
Cooling	Standard	3.3	0.9	33.4	8.8	86	11	9	44	64	HIGH	27/19	35/–
	Overload	3.7	1.1	37.8	11.4	90	21	18	54	52	HIGH	32/24	43/–
	Low load	1.0	0.8	10.0	7.9	19	4	4	8	27	LOW	18/15.5	–5/–
Heating	Standard	2.5	0.6	25.8	6.3	67	6	42	2	65	HIGH	20/–	7/6
	Overload	3.4	1.1	34.7	11.5	85	23	55	16	31	LOW	30/–	24/18
	Low load	2.0	0.2	20.3	2.3	89	–16	34	–18	90	HIGH	15/–	–20/(70%)

* 4 poles are provided to this compressor.

The compressor frequency (Hz) measured with a clamp meter is 2 times of revolutions (rps) of the compressor.

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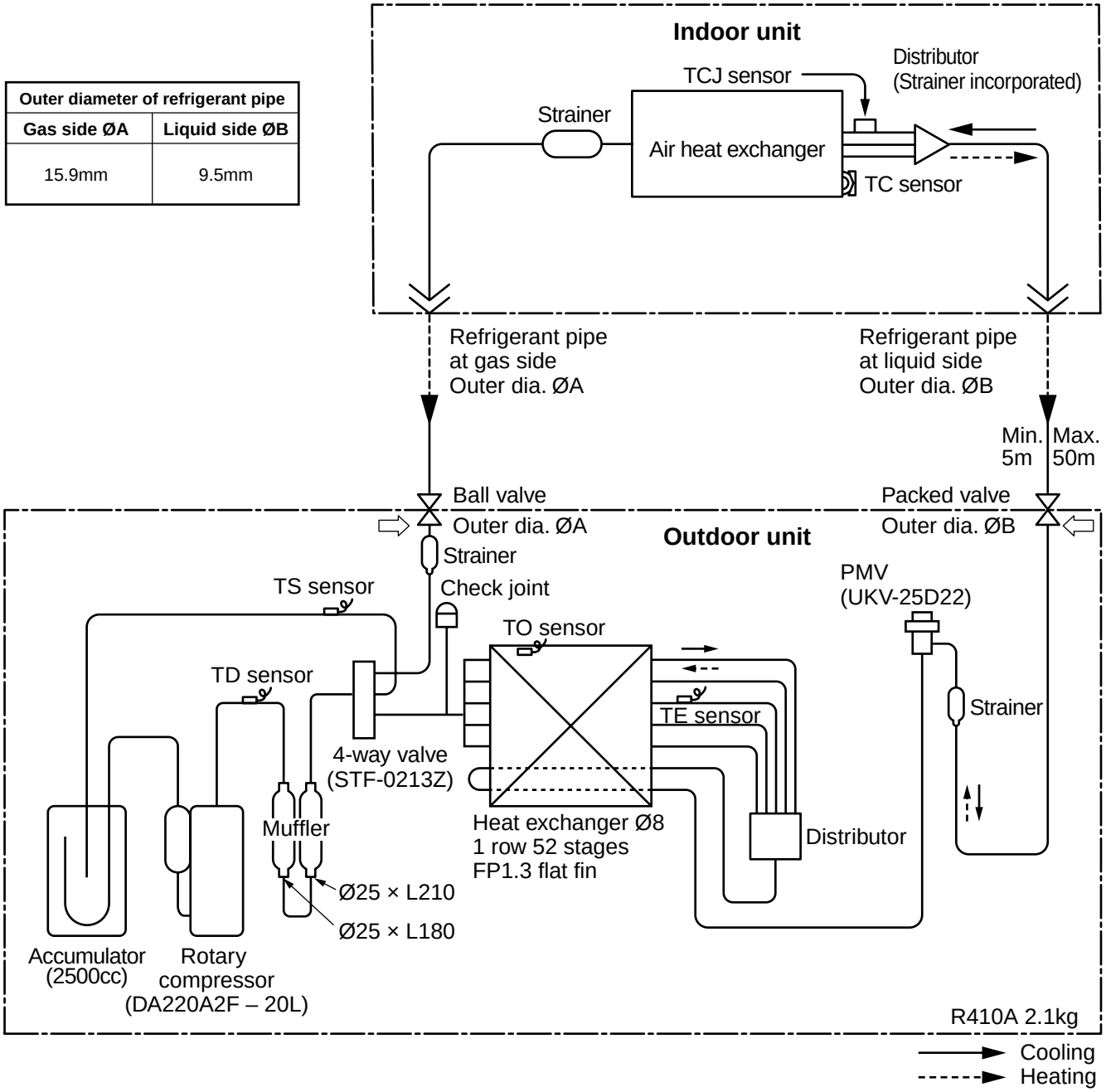
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM1100UT-E, RAV-SM1100AT-E (A03-003)

Outer diameter of refrigerant pipe	
Gas side ØA	**Liquid side ØB**
15.9mm	9.5mm



		Pressure (MPa)		Pipe surface temperature (°C)				Compressor revolutions per second (rps) *	Indoor fan	Indoor/Outdoor temp. conditions (DB/WB) (°C)	
				Discharge	Suction	Indoor heat exchanger	Outdoor heat exchanger				
		Pd	Ps	(TD)	(TS)	(TC)	(TE)			Indoor	Outdoor
Cooling	Standard	3.3	0.9	88	10	8	38	92	HIGH	27/19	35/–
	Overload	3.0	1.0	88	14	14	46	74	HIGH	32/24	43/–
	Low load	1.0	0.8	30	8	8	3	27	LOW	18/15.5	–5/–
Heating	Standard	2.5	0.6	90	4	50	2	86	HIGH	20/–	7/6
	Overload	3.3	1.1	83	17	54	13	52	LOW	30/–	24/18
	Low load	1.8	0.2	80	–23	29	–20	100	HIGH	15/–	–20/(70%)

* 4 poles are provided to this compressor.

The compressor frequency (Hz) measured with a clamp meter is 2 times of revolutions (rps) of the compressor.

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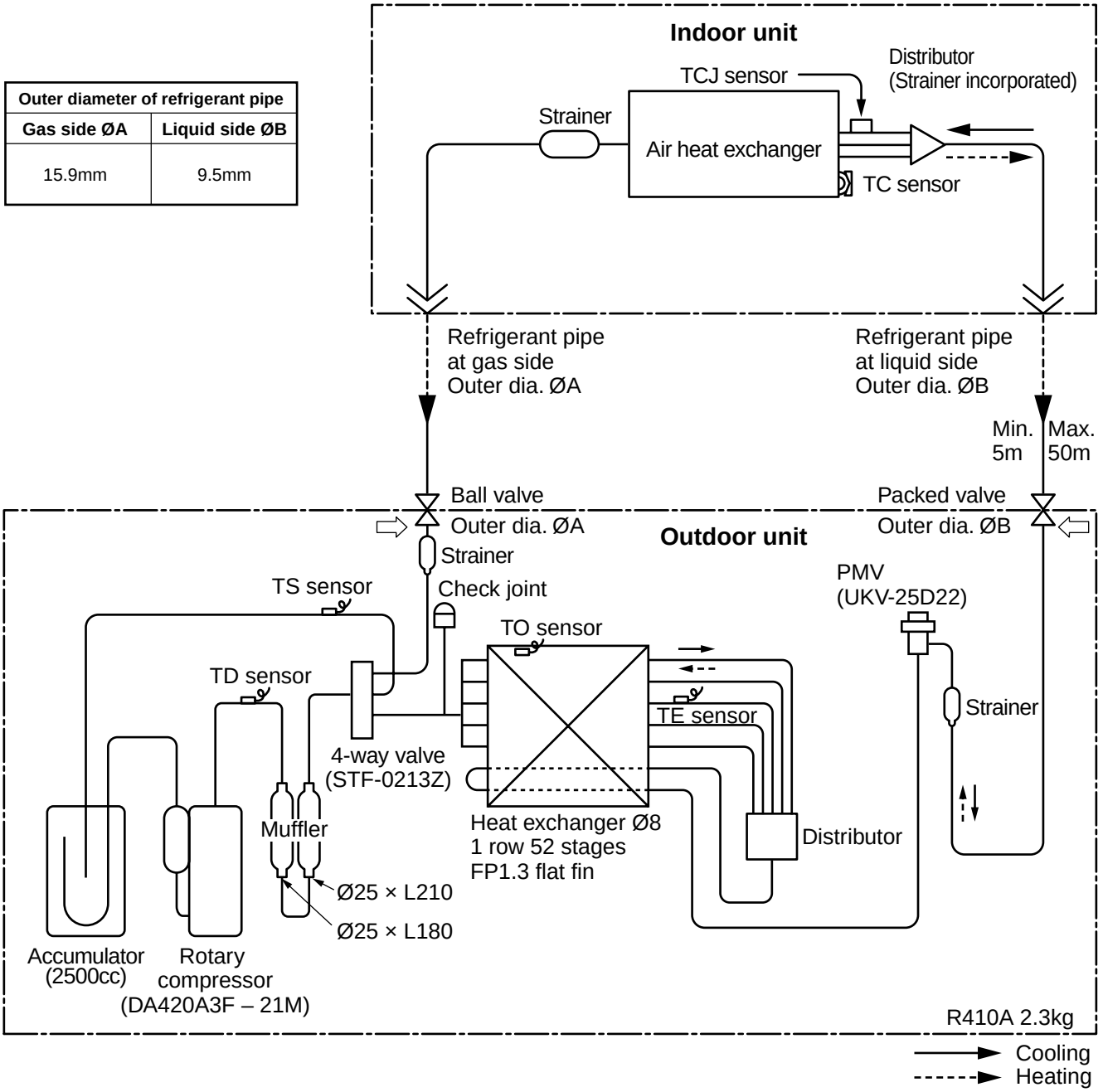
RAV-SM1400UT-E, RAV-SM1400AT-E, RAV-SM1401BT-E, RAV-SM1401CT-E, RAV-SP1400AT-E

Outer diameter of refrigerant pipe	
Gas side ØA	**Liquid side ØB**
15.9mm	9.5mm



		Pressure (MPa)		Pipe surface temperature (°C)				Compressor revolutions per second (rps) *	Indoor fan	Indoor/Outdoor temp. conditions (DB/WB) (°C)	
				Discharge	Suction	Indoor heat exchanger	Outdoor heat exchanger				
		Pd	Ps	(TD)	(TS)	(TC)	(TE)			Indoor	Outdoor
Cooling	Standard	3.3	0.9	84	11	10	40	56	HIGH	27/19	35/–
	Overload	3.5	1.0	87	7	15	54	54	HIGH	32/24	43/–
	Low load	1.7	0.8	44	8	4	8	27	LOW	18/15.5	–5/–
Heating	Standard	3.0	0.6	79	2	44	2	60	HIGH	20/–	7/6
	Overload	3.4	1.1	78	21	54	17	24	LOW	30/–	24/18
	Low load	2.0	0.2	82	–21	36	–18	73	HIGH	15/–	–20/(70%)

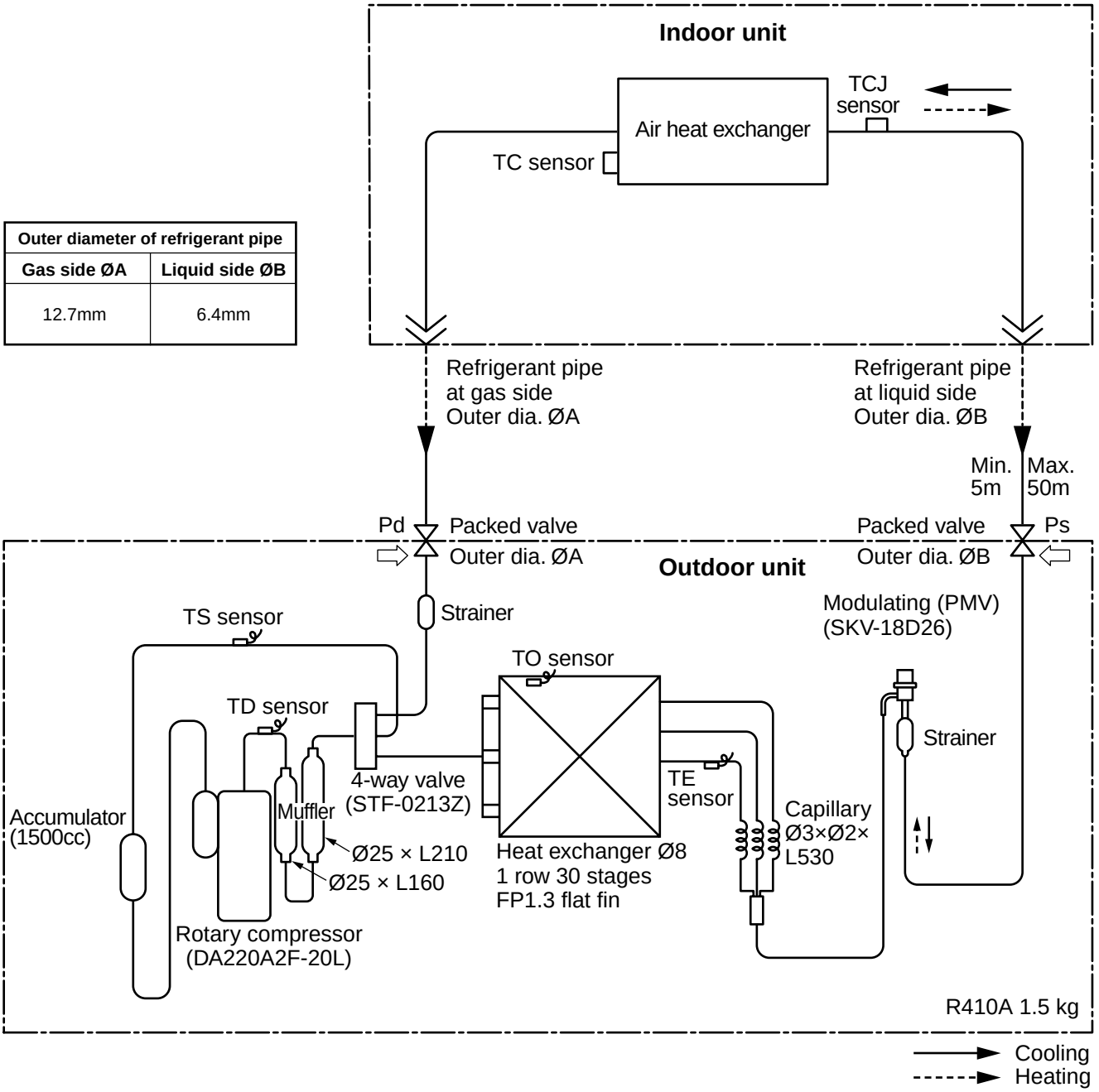
* 4 poles are provided to this compressor.

The compressor frequency (Hz) measured with a clamp meter is 2 times of revolutions (rps) of the compressor.

Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SP560AT-E (A03-014)

Outer diameter of refrigerant pipe	
Gas side ØA	Liquid side ØB
12.7mm	6.4mm



		Pressure (MPa)		Pipe surface temperature (°C)				Compressor revolutions per second (rps) *	Indoor fan	Indoor/Outdoor temp. conditions (DB/WB) (°C)	
				Discharge	Suction	Indoor heat exchanger	Outdoor heat exchanger				
		Pd	Ps	(TD)	(TS)	(TC)	(TE)			Indoor	Outdoor
Cooling	Standard	2.71	1.03	75	15	10	38	43	HIGH	27/19	35/–
	Overload	3.48	1.16	81	20	16	51	44	HIGH	32/24	43/–
	Low load	1.92	0.74	34	5	2	11	24	LOW	18/15.5	–5/–
Heating	Standard	2.22	0.72	62	6	38	2	41	HIGH	20/–	7/6
	Overload	3.47	1.16	81	20	55	15	41	LOW	30/–	24/18
	Low load	1.79	0.25	71	–16	30	–18	70	HIGH	15/–	–15/(70%)

* 4 poles are provided to this compressor.

The compressor frequency (Hz) measured with a clamp meter is 2 times of revolutions (rps) of the compressor.

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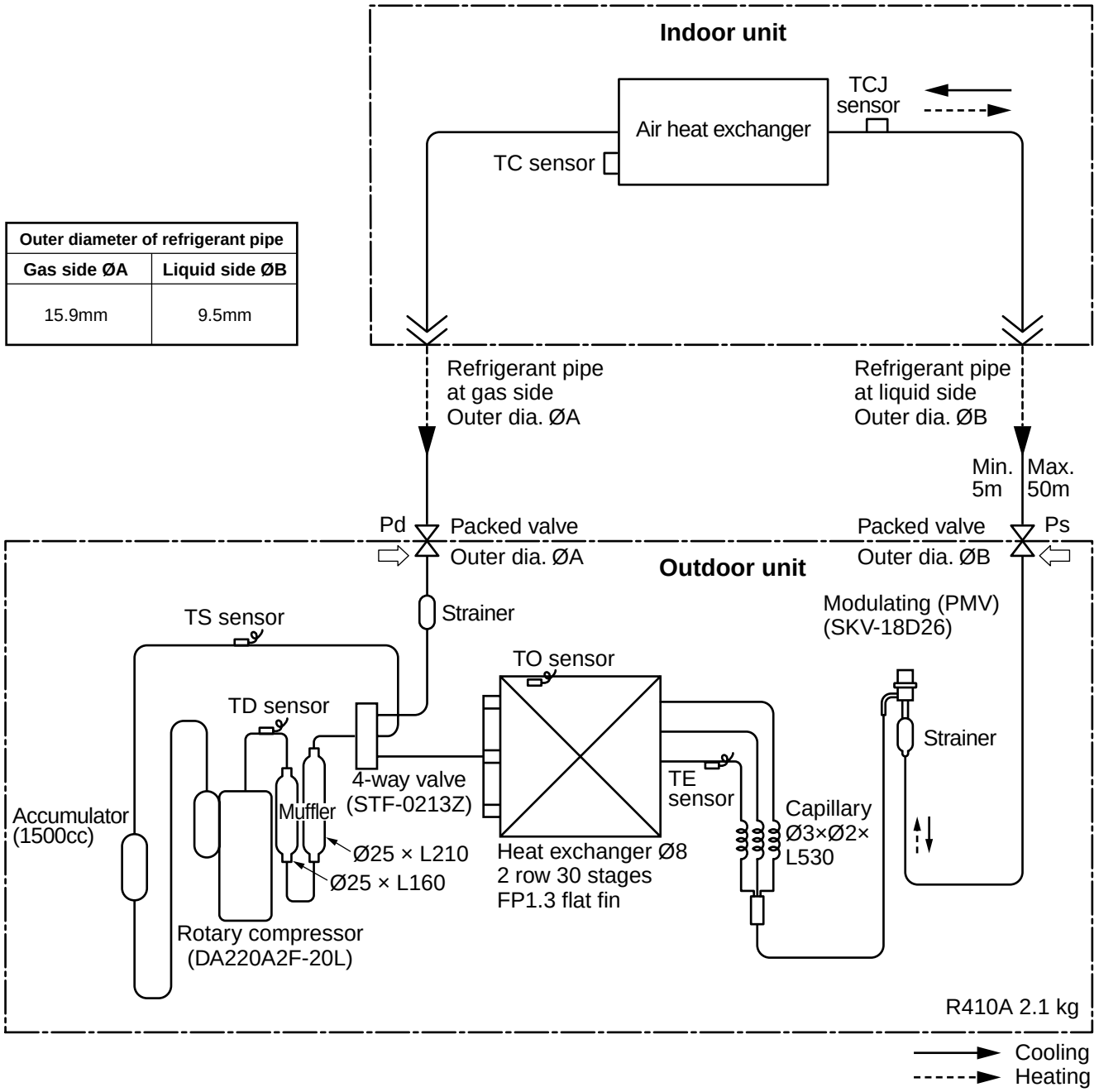
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SP800AT-E (A03-014)



Outer diameter of refrigerant pipe	
Gas side ØA	**Liquid side ØB**
15.9mm	9.5mm

		Pressure (MPa)		Pipe surface temperature (°C)				Compressor revolutions per second (rps) *	Indoor fan	Indoor/Outdoor temp. conditions (DB/WB) (°C)	
				Discharge	Suction	Indoor heat exchanger	Outdoor heat exchanger				
		Pd	Ps	(TD)	(TS)	(TC)	(TE)			Indoor	Outdoor
Cooling	Standard	2.72	0.93	74	12	11	40	55	HIGH	27/19	35/–
	Overload	3.57	1.10	80	21	17	52	47	HIGH	32/24	43/–
	Low load	1.89	0.74	34	7	2	12	24	LOW	18/15.5	–5/–
Heating	Standard	2.58	0.68	72	4	41	2	62	HIGH	20/–	7/6
	Overload	3.49	1.22	79	19	55	16	28	LOW	30/–	24/18
	Low load	2.30	0.25	91	–17	37	–19	90	HIGH	15/–	–15/(70%)

∗ 4 poles are provided to this compressor.

The compressor frequency (Hz) measured with a clamp meter is 2 times of revolutions (rps) of the compressor.

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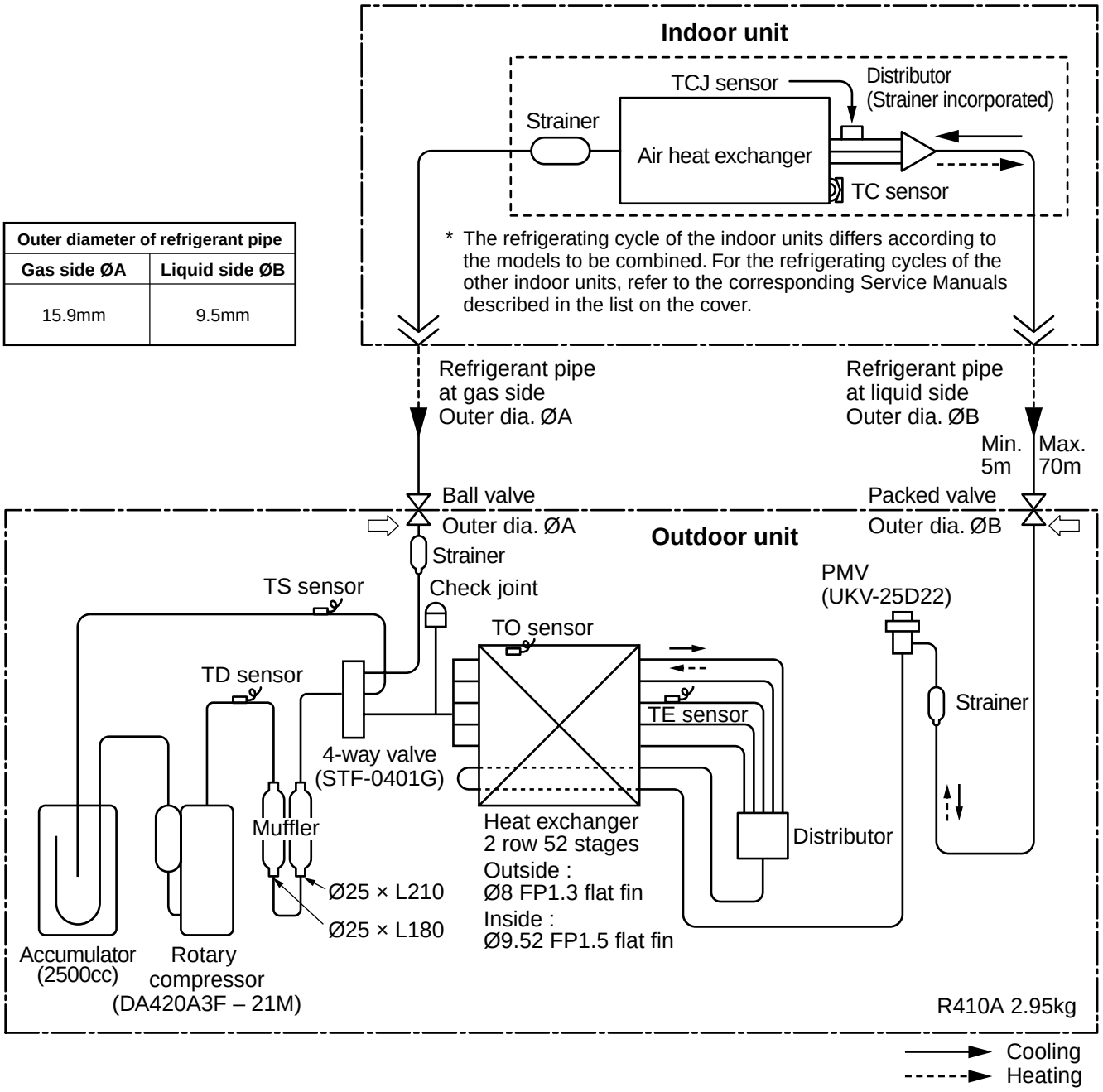
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM1100UT-E, RAV-SM1101BT-E, RAV-SM1101CT-E, RAV-SP1100AT-E (A03-014)



Outer diameter of refrigerant pipe	
Gas side ØA	**Liquid side ØB**
15.9mm	9.5mm

		Pressure (MPa)		Pipe surface temperature (°C)				Compressor revolutions per second (rps) *	Indoor fan	Indoor/Outdoor temp. conditions (DB/WB) (°C)	
				Discharge	Suction	Indoor heat exchanger	Outdoor heat exchanger				
		Pd	Ps	(TD)	(TS)	(TC)	(TE)			Indoor	Outdoor
Cooling	Standard	2.55	0.98	69	12	10	40	40	HIGH	27/19	35/–
	Overload	3.28	1.08	82	17	16	48	50	HIGH	32/24	43/–
	Low load	1.76	0.76	47	8	5	27	24	LOW	18/15.5	–5/–
Heating	Standard	2.58	0.73	68	3	40	3	44	HIGH	20/–	7/6
	Overload	3.43	1.18	75	20	56	16	24	LOW	30/–	24/18
	Low load	2.10	0.32	88	–14	34	–13	63	HIGH	15/–	–15/(70%)

* 4 poles are provided to this compressor.
The compressor frequency (Hz) measured with a clamp meter is 2 times of revolutions (rps) of the compressor.

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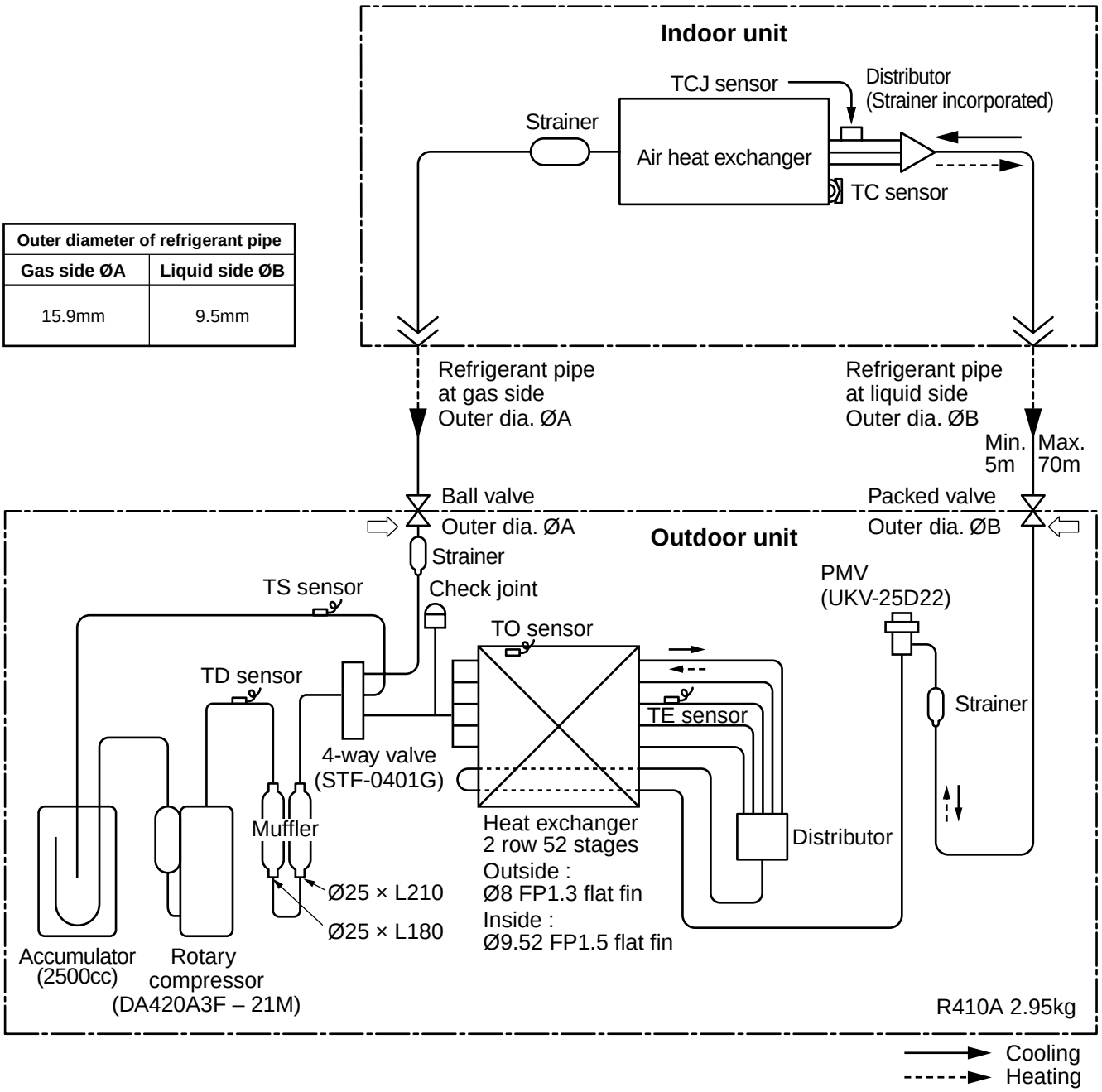
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM1401CT-E, RAV-SP1400AT-E (A03-014)



Outer diameter of refrigerant pipe	
Gas side ØA	**Liquid side ØB**
15.9mm	9.5mm

		Pressure (MPa)		Pipe surface temperature (°C)				Compressor revolutions per second (rps) *	Indoor fan	Indoor/Outdoor temp. conditions (DB/WB) (°C)	
				Discharge	Suction	Indoor heat exchanger	Outdoor heat exchanger				
		Pd	Ps	(TD)	(TS)	(TC)	(TE)			Indoor	Outdoor
Cooling	Standard	2.76	0.91	74	11	9	39	53	HIGH	27/19	35/–
	Overload	3.46	1.03	82	17	16	48	51	HIGH	32/24	43/–
	Low load	1.77	0.78	48	9	6	27	24	LOW	18/15.5	–5/–
Heating	Standard	2.65	0.69	75	3	43	3	55	HIGH	20/–	7/6
	Overload	3.33	1.08	74	19	55	15	24	LOW	30/–	24/18
	Low load	2.50	0.22	98	–22	43	–18	73	HIGH	15/–	–15/(70%)

* 4 poles are provided to this compressor.
The compressor frequency (Hz) measured with a clamp meter is 2 times of revolutions (rps) of the compressor.

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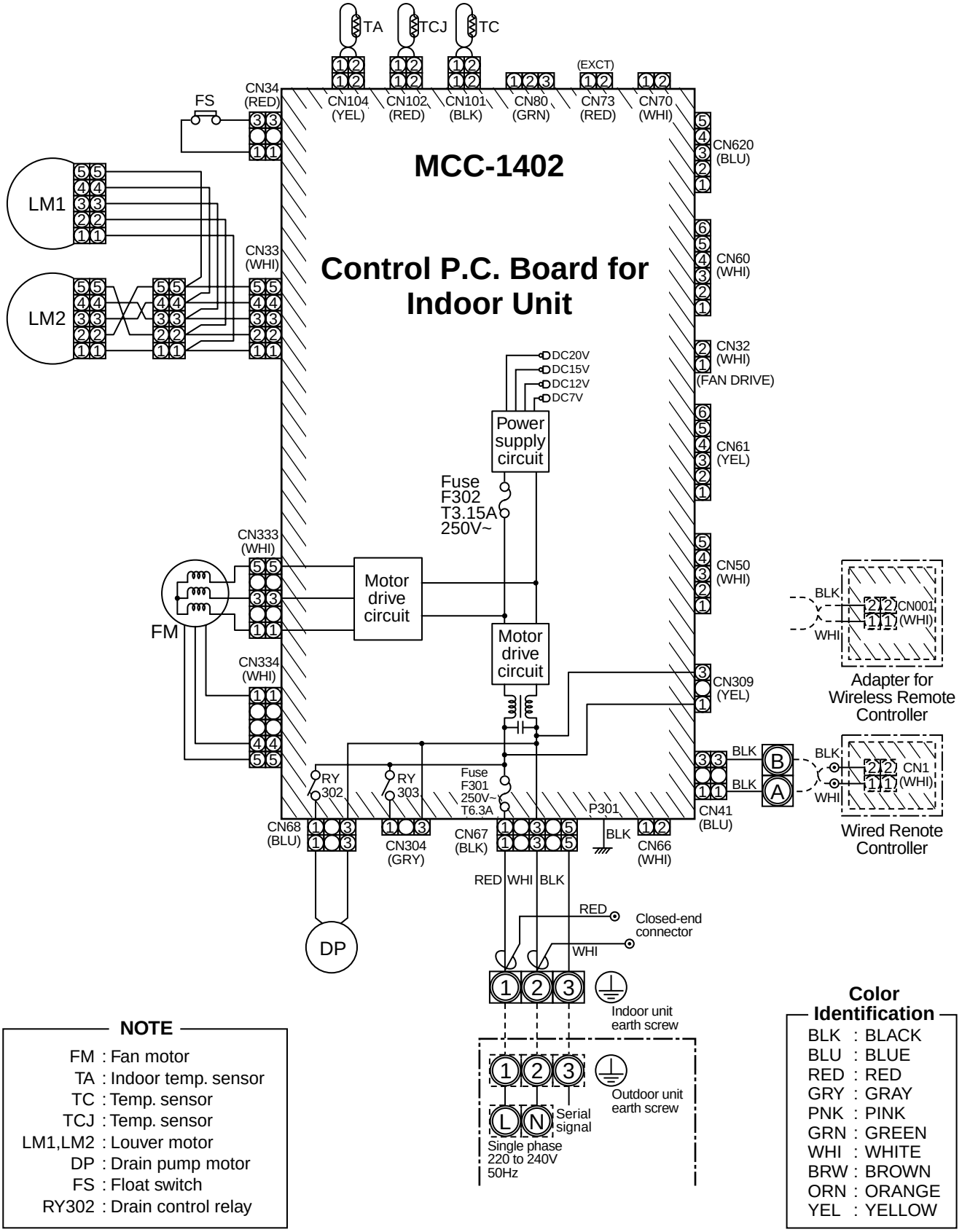
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

5. WIRING DIAGRAM

5-1. Indoor Unit

5-1-1. 4-Way Air Discharge Cassette Type

RAV-SM560UT-E, RAV-SM800UT-E (A02-014), RAV-SM1100UT-E, RAV-SM1400UT-E (A03-003), RAV-SP1100UT-E (A03-014)



NOTE

FM	: Fan motor
TA	: Indoor temp. sensor
TC	: Temp. sensor
TCJ	: Temp. sensor
LM1,LM2	: Louver motor
DP	: Drain pump motor
FS	: Float switch
RY302	: Drain control relay

Color Identification

BLK	: BLACK
BLU	: BLUE
RED	: RED
GRY	: GRAY
PNK	: PINK
GRN	: GREEN
WHI	: WHITE
BRW	: BROWN
ORN	: ORANGE
YEL	: YELLOW

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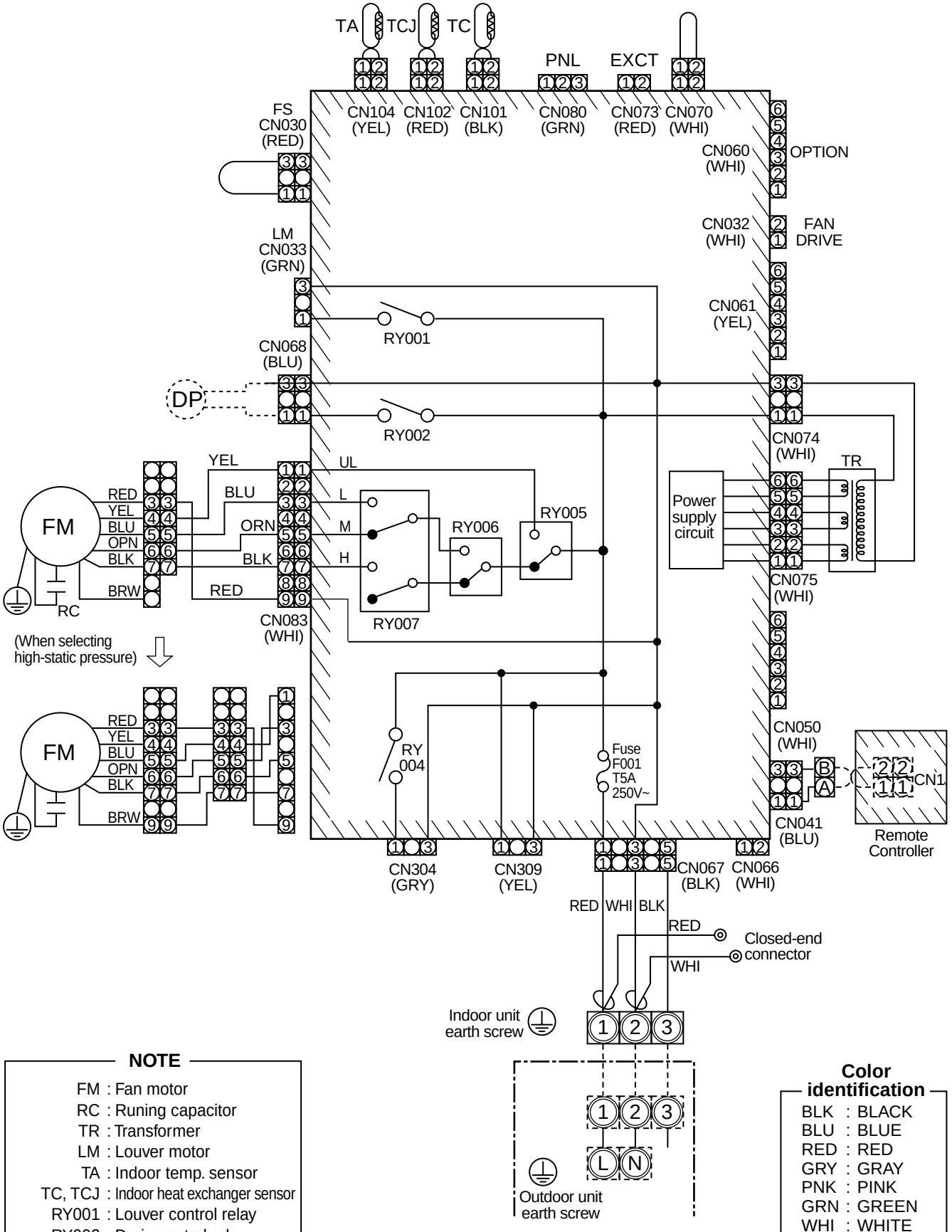
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

5-1-2. Concealed Duct Type

RAV-SM560BT-E, RAV-SM800BT-E (A02-014)



NOTE

FM	: Fan motor
RC	: Runing capacitor
TR	: Transformer
LM	: Louver motor
TA	: Indoor temp. sensor
TC, TCJ	: Indoor heat exchanger sensor
RY001	: Louver control relay
RY002	: Drain control relay
RY005~007	: Air volume control relay
DP	: Drain pump motor

Color identification

BLK	: BLACK
BLU	: BLUE
RED	: RED
GRY	: GRAY
PNK	: PINK
GRN	: GREEN
WHI	: WHITE
BRW	: BROWN
ORN	: ORANGE
YEL	: YELLOW

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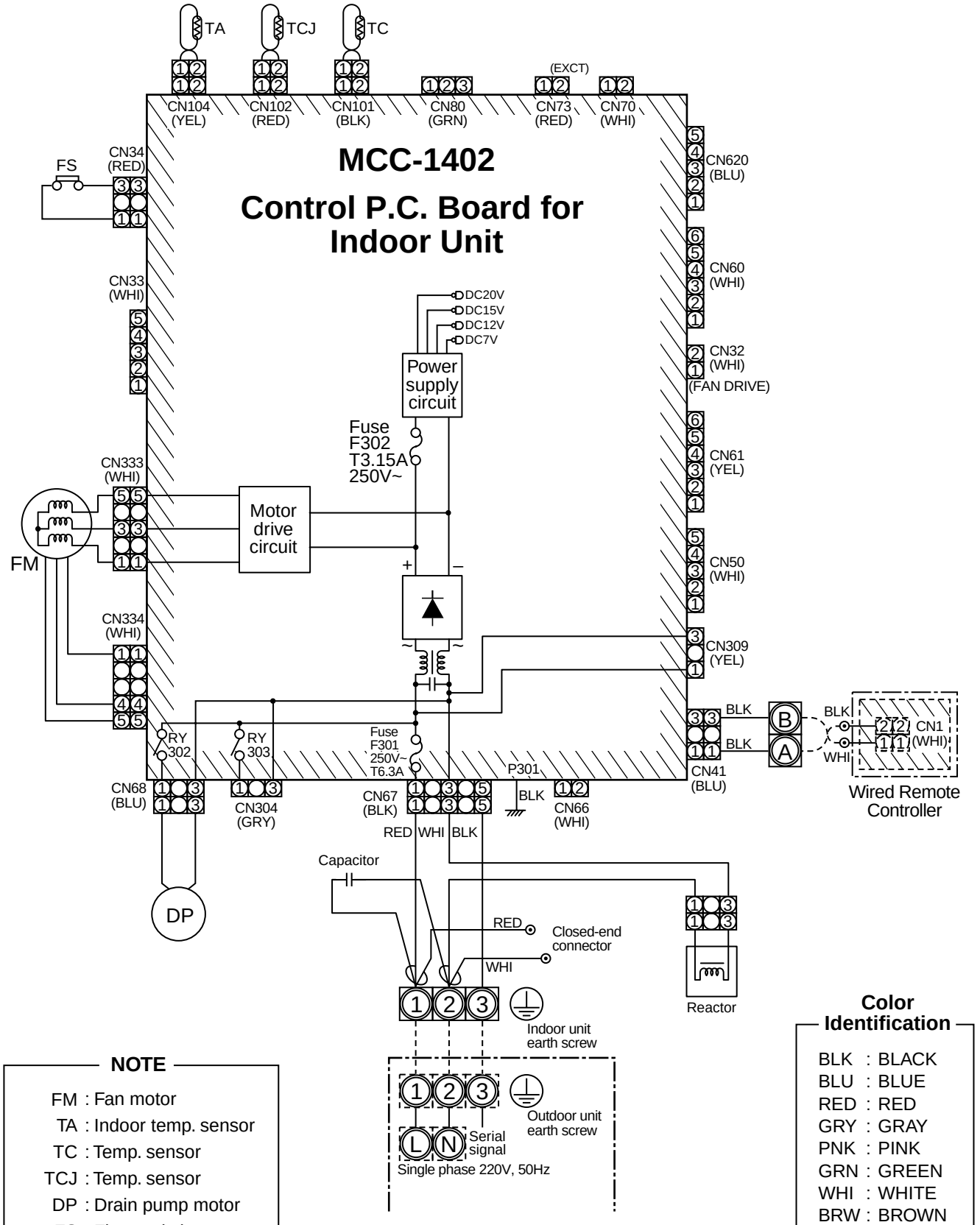
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM561BT-E, RAV-SM801BT-E, RAV-SM1101BT-E, RAV-SM1401BT-E (A03-007)



NOTE

FM : Fan motor
TA : Indoor temp. sensor
TC : Temp. sensor
TCJ : Temp. sensor
DP : Drain pump motor
FS : Float switch
RY302 : Drain control relay

Color Identification

BLK : BLACK
BLU : BLUE
RED : RED
GRY : GRAY
PNK : PINK
GRN : GREEN
WHI : WHITE
BRW : BROWN
ORN : ORANGE
YEL : YELLOW

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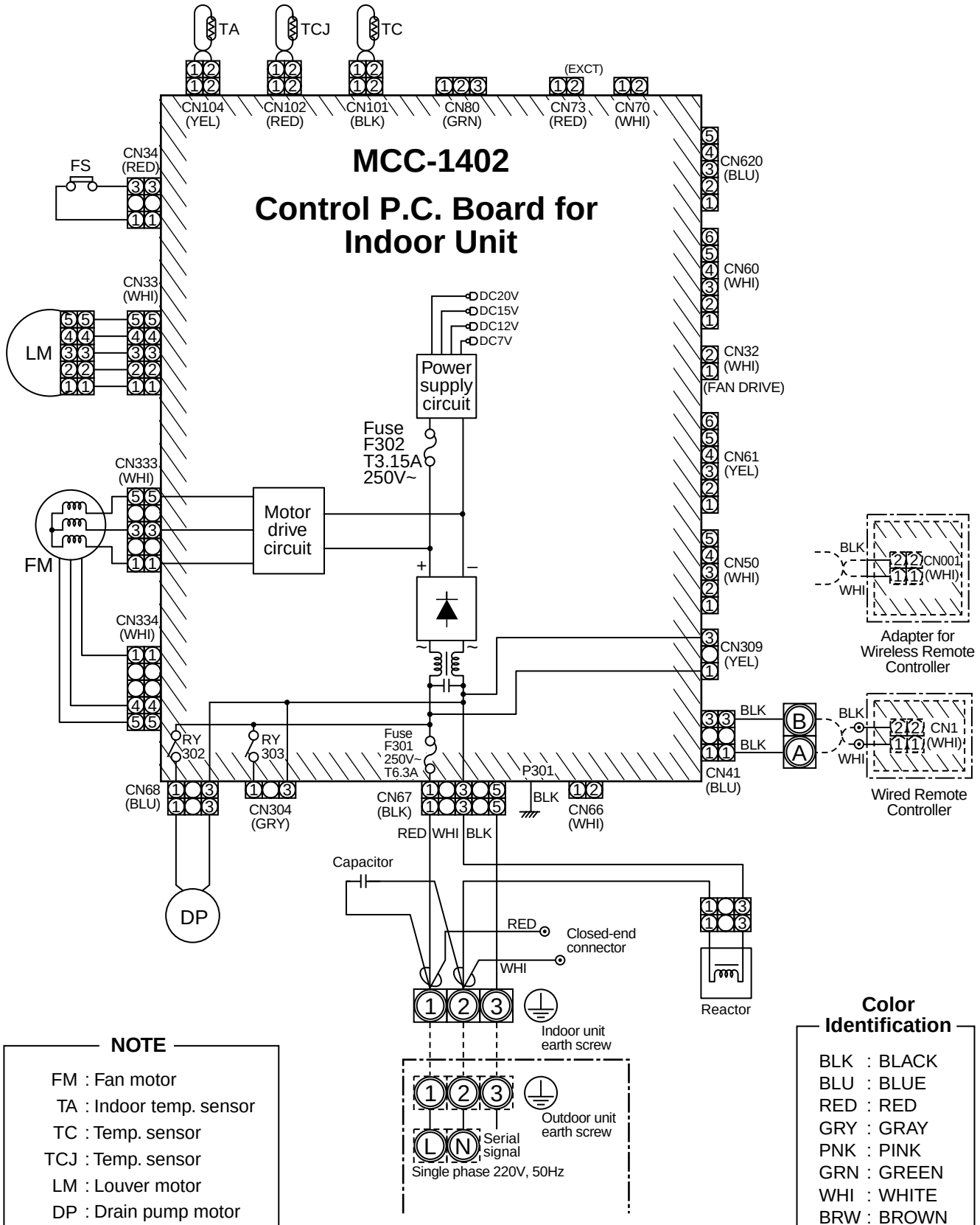
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

5-1-3. Under Ceiling Type

RAV-SM561CT-E, RAV-SM801CT-E, RAV-SM1101CT-E, RAV-SM1401CT-E (A03-016)



NOTE

FM	: Fan motor
TA	: Indoor temp. sensor
TC	: Temp. sensor
TCJ	: Temp. sensor
LM	: Louver motor
DP	: Drain pump motor
FS	: Float switch
RY302	: Drain control relay

Color Identification

BLK	: BLACK
BLU	: BLUE
RED	: RED
GRY	: GRAY
PNK	: PINK
GRN	: GREEN
WHI	: WHITE
BRW	: BROWN
ORN	: ORANGE
YEL	: YELLOW

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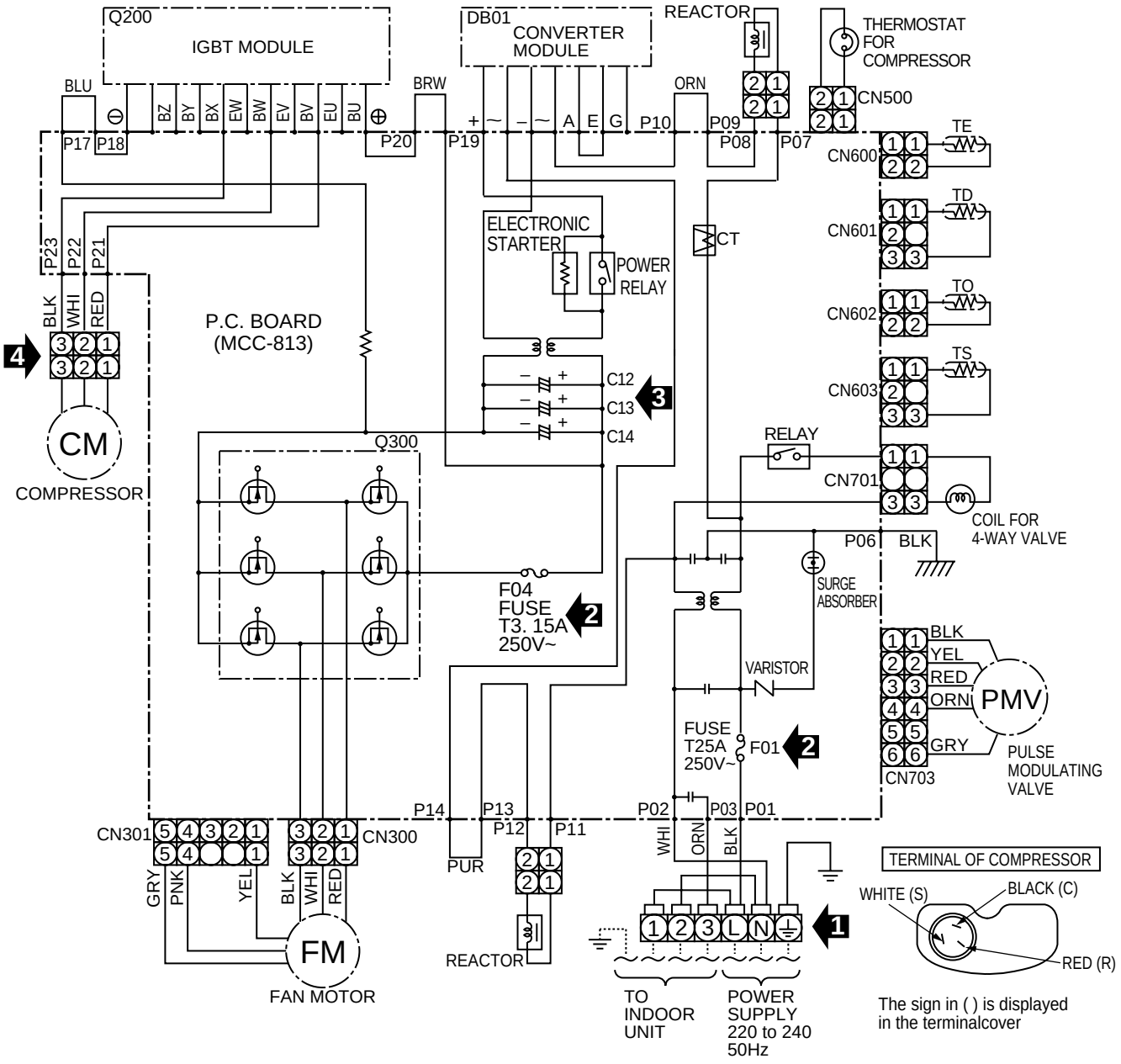
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

5-2. Outdoor Unit

RAV-SM560AT-E (A02-014)



SIMPLE CHECK POINTS FOR DIAGNOSING FAULTS

Check items	Diagnosis result
1	TERMINAL BLOCK There is no supply voltage (AC220 to 240V) between Ⓛ - Ⓝ , ① - ② There is no voltage (DC15 to 25V) ② - ③ → Power supply and connecting cable check
2	FUSE T25A 250V to fuse (F01) blown T3.15A 250V to fuse (F04) blown → Converter module (DB01) and electrolytic capacitor (C12 to C14) check IGBT module (Q200) check Fan motor check
3	ELECTROLYTIC CAPACITOR VOLTAGE (C12, C13, C14) DC320V not available between ⊕⊖ terminal of electrolytic capacitor → T25A fuse (F01) check P.C. board and converter module (DB01) check
4	INVERTER OUTPUT (Inverter and compressor connector out of position) (Please confirm within six minutes after instructing in the drive.) Voltage between each line of inverter side conector pins are not equal. → IGBT module and P.C. board check

Color Identification

BLK	: BLACK	WHI	: WHITE
BLU	: BLUE	BRW	: BROWN
RED	: RED	ORN	: ORANGE
GRY	: GRAY	YEL	: YELLOW
PNK	: PINK	PUR	: PURPLE
GRN	: GREEN		

NOTE

CM	: Compressor
PMV	: Pulse modulating valve
FM	: Fan motor
TE	: Heat exchanger Temp. Sensor
TD	: Discharge Temp. Sensor
TO	: Outdoor Temp. Sensor
TS	: Suction Temp. Sensor
IGBT	: Insulated Gate Bipolar Transistor
DB01	: Converter module
CT	: Curreut Transformer
Q300	: Fan motor driver module

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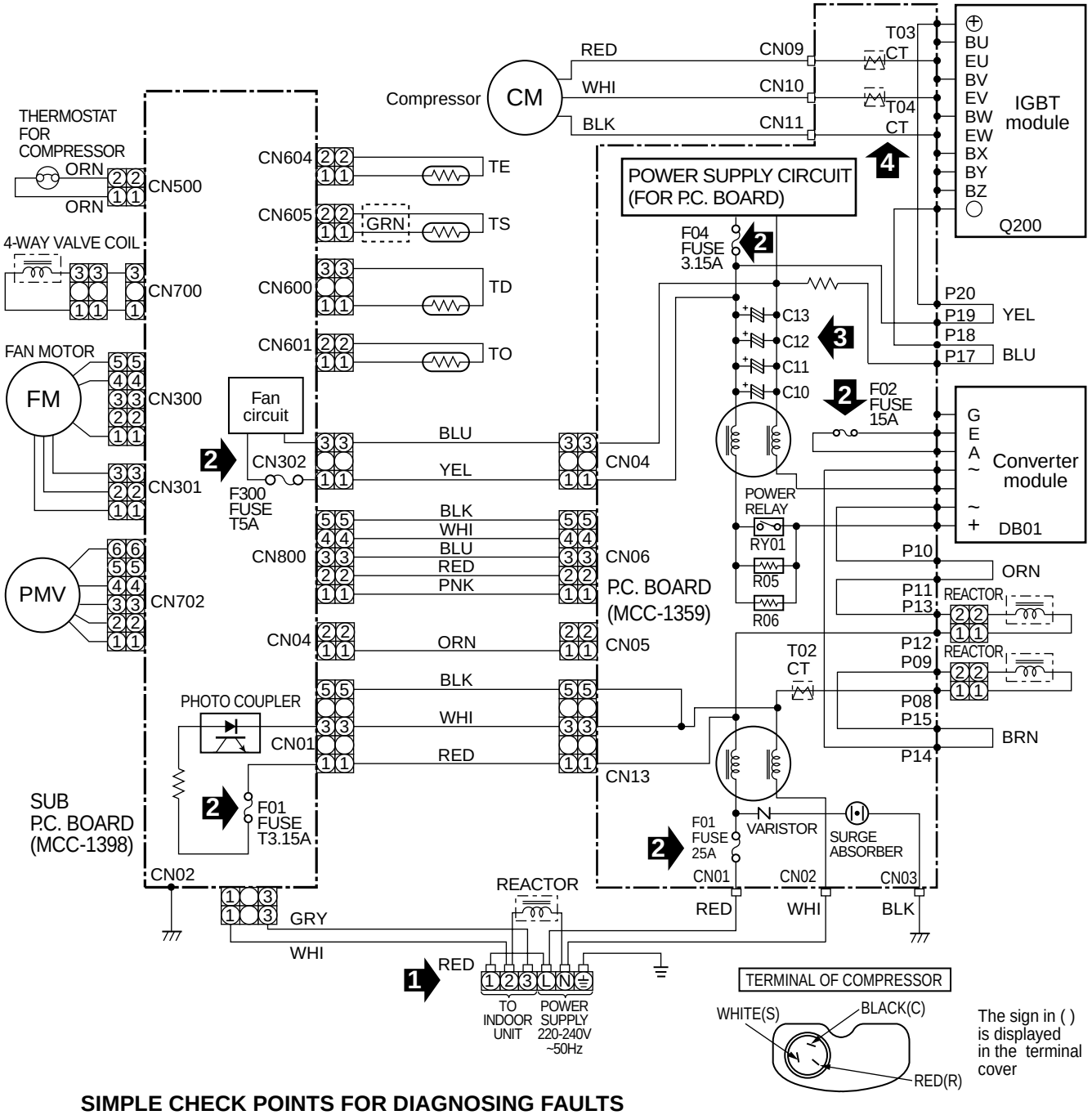
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM800AT-E (A02-014), RAV-SP560AT-E, RAV-SP800AT-E (A03-014)



SIMPLE CHECK POINTS FOR DIAGNOSING FAULTS

Check items	Diagnosis result
1	TERMINAL BLOCK There is no supply voltage (AC220 to 240V) between Ⓛ - Ⓝ , ① - ② There is no voltage (DC15 to 25V) ② - ③ → Connecting cable check
2	FUSE 25A fuse (F01) blown, 15A fuse (F02) blown 3.15A fuse (F04) blown, T5A fuse (F300) blown (SUB P.C. board) T3.15A fuse (F01) blown (SUB P.C. board) → Converter module (DB01) and electrolytic capacitor (C10 to C13) check IGBT module (Q200) check, Fan motor check SUB P.C. board check
3	ELECTROLYTIC CAPACITOR VOLTAGE (C10, C11, C12, C13) DC320V not available between ⊕○terminal of electrolytic capacitor → 25A fuse (F01) check P.C. board and coverter module (DB01) check
4	INVERTER OUTPUT (CN09, CN10, CN11) (Please confirm within six minutes after instructing in the drive.) Voltage between each line of inverterside conector pins are not equal. → IGBT module and P.C. board check

Color Identification

BLK	: BLACK	WHI	: WHITE
BLU	: BLUE	BRN	: BROWN
RED	: RED	ORN	: ORANGE
GRY	: GRAY	YEL	: YELLOW
PNK	: PINK	PUR	: PURPLE
GRN	: GREEN		

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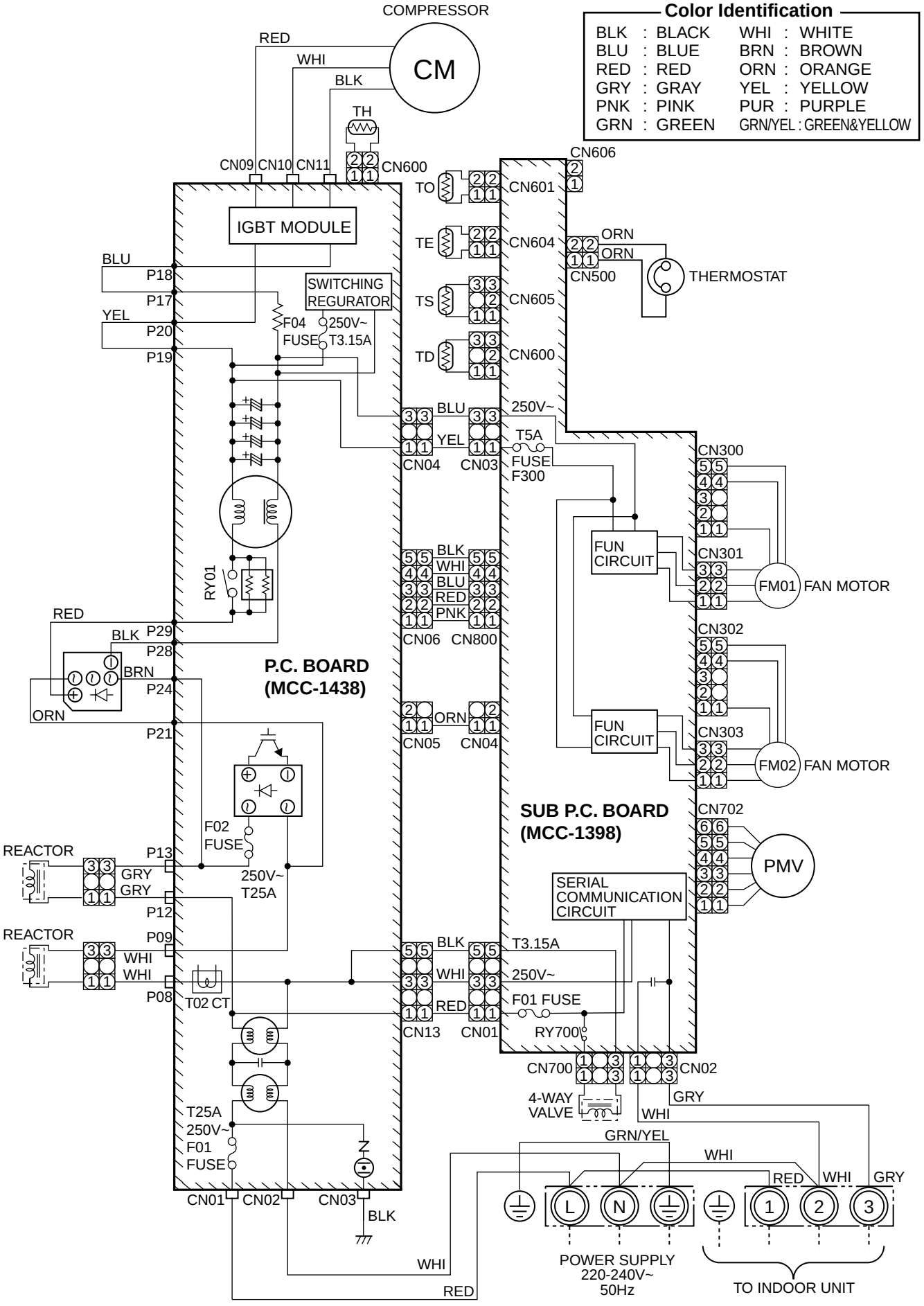
RAV-SM1100AT-E, RAV-SM1400AT-E (A03-003), RAV-SP1100AT-E, RAV-SP1400AT-E (A03-014)



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6. SPECIFICATIONS OF ELECTRICAL PARTS

6-1. Indoor Unit

6-1-1. 4-Way Air Discharge Cassette Type

RAV-SM560UT-E, RAV-SM800UT-E (A02-014)

No.	Parts name	Type	Specifications
1	Fan motor (for indoor)	SWF-230-60-1	Output (Rated) 60 W, 220–240 V
2	Thermo. sensor (TA-sensor)	155 mm	10 kΩ at 25°C
3	Heat exchanger sensor (TCJ-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C
4	Heat exchanger sensor (TC-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C
5	Float switch	FS-0218-106	
6	Drain pump motor	ADP-1406	

RAV-SM1100UT-E, RAV-SM1400UT-E (A03-003)

No.	Parts name	Type	Specifications
1	Fan motor	SWF-230-60-1 (RAV-SM1100UT-E)	Output (Rated) 60 W
		SWF-230-90-1 (RAV-SM1400UT-E)	Output (Rated) 90 W
2	Thermo. sensor (TA-sensor)	155 mm	10 kΩ at 25°C
3	Heat exchanger sensor (TCJ-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C
4	Heat exchanger sensor (TC-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C
5	Float switch	FS-0218-102	
6	Drain pump motor	ADP-1409	

RAV-SP1100UT-E (A03-014)

No.	Parts name	Type	Specifications
1	Fan motor	SWF-200-90-1	Output (Rated) 90 W
2	Thermo. sensor (TA-sensor)	155 mm	10 kΩ at 25°C
3	Heat exchanger sensor (TCJ-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C
4	Heat exchanger sensor (TC-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C
5	Float switch	FS-0218-102	
6	Drain pump motor	ADP-1409	

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6-1-2. Concealed Duct Type

RAV-SM560BT-E, RAV-SM800BT-E (A02-014)

No.	Parts name	Type	Specifications
1	Fan motor (RAV-SM800BT-E)	STF-230-80-4C	Output (Rated) 80 W, 220–240 V, 4P
2	Fan motor (RAV-SM560BT-E)	STF-220-80-4C	Output (Rated) 80 W, 220–240 V, 4P
3	Capacitor (RAV-SM800BT-E)	EAG40M805UF1	400WV, 5µF
4	Capacitor (RAV-SM560BT-E)	CMPS400-4.0	400WV, 4.0µF
5	Thermo. sensor (TA-sensor)	818 mm	10 kΩ at 25°C
6	Heat exchanger sensor (TC-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C
7	Heat exchanger sensor (TCJ-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C

RAV-SM561BT-E, SM801BT-E, SM1101BT-E, SM1401BT-E (A03-007)

No.	Parts name	Type	Specifications
1	Fan motor (SM801BT-E)	ICF-280-120-1	Output (Rated) 120 W, 220–240 V
2	Fan motor (SM561BT-E/SM1101BT-E/SM1401BT-E)	ICF-280-120-2	Output (Rated) 120 W, 220–240 V
3	Thermo. sensor (TA-sensor)	258 mm	10 kΩ at 25°C
4	Heat exchanger sensor (TCJ-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C
5	Heat exchanger sensor (TC-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C
6	Float switch	FS-0218-106	
7	Drain pump motor	ADP-1406	
8	Reactor	CH-43-2Z-K	10 mH, 1 A

6-1-3. Under Ceiling Type

RAV-SM561CT-E, SM801CT-E, SM1101CT-E, SM1401CT-E (A03-016)

No.	Parts name	Type	Specifications
1	Fan motor (SM501CT-E)	SWF-280-60-1	Output (Rated) 60 W, 220–240 V
2	Fan motor (SM801CT-E)	SWF-280-60-2	Output (Rated) 120 W, 220–240 V
3	Fan motor (SM1101CT-E/SM1401CT-E)	SWF-280-120-2	Output (Rated) 120 W, 220–240 V
4	Thermo. sensor (TA-sensor)	258 mm	10 kΩ at 25°C
5	Heat exchanger sensor (TCJ-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C
6	Heat exchanger sensor (TC-sensor)	Ø6 mm, 1200 mm	10 kΩ at 25°C
7	Louver motor	MP24GA1	DC 15 V
8	Reactor	CH-43-2Z-K	10 mH, 1 A

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6-2. Outdoor Unit

RAV-SM560AT-E (A03-007)

No.	Parts name	Type	Specifications
1	Fan motor	ICF-140-43-1	Output (Rated) 40 W
2	Compressor	DA130A1F-23F	3 phase, 4P, 1100 W
3	Reactor	CH-57	10 mH, 16A
4	Outdoor temp. sensor (To-sensor)	—	10 kΩ at 25°C
5	Heat exchanger sensor (Te-sensor)	—	10 kΩ at 25°C
6	Suction temp. sensor (Ts-sensor)	—	10 kΩ at 25°C
7	Discharge temp. sensor (Td-sensor)	—	50 kΩ at 25°C
8	Fuse (Switching power (Protect))		T3.15 A, AC 250 V
9	Fuse (Inverter, input (Current protect)		25 A, AC 250 V
10	4-way valve solenoid coil	STF-0108G	
11	Compressor thermo. (Protection)	US-622	ON : 90 ± 5°C, OFF : 125 ± 4°C

RAV-SM800AT-E (A03-007)

No.	Parts name	Type	Specifications
1	Fan motor	ICF-140-63-1 or ICF-140-63-2	Output (Rated) 63 W
2	Compressor	DA220A2F-20L	3 phase, 4P, 1600 W
3	Reactor	CH-47	8 mH, 16 A
4	Outdoor temp. sensor (To-sensor)	—	10 kΩ at 25°C
5	Heat exchanger sensor (Te-sensor)	—	10 kΩ at 25°C
6	Suction temp. sensor (Ts-sensor)	—	10 kΩ at 25°C
7	Discharge temp. sensor (Td-sensor)	—	50 kΩ at 25°C
8	Fuse (Switching power (Protect))		T3.15 A, AC 250 V
9	Fuse (Inverter, input (Current protect))		25 A, AC 250 V
10	4-way valve solenoid coil	DKV-M0ZS743B0	
11	Compressor thermo. (Protection)	US-622	ON : 90 ± 5°C, OFF : 125 ± 4°C

RAV-SM1100AT-E (A03-003)

No.	Parts name	Type	Specifications
1	Fan motor	ICF-140-63-2	Output (Rated) 63 W
		ICF-140-43-2	Output (Rated) 43 W
2	Compressor	DA220A2F-20L	3 phase, 4P, 2000 W
3	Reactor	CH-56	6 mH, 18.5 A
4	Outdoor temp. sensor (To-sensor)	—	10 kΩ at 25°C
5	Heat exchanger sensor (Te-sensor)	—	10 kΩ at 25°C
6	Suction temp. sensor (Ts-sensor)	—	10 kΩ at 25°C
7	Discharge temp. sensor (Td-sensor)	—	50 kΩ at 25°C
8	Fuse (Switching power (Protect))		T3.15 A, AC 250 V
9	Fuse (Inverter, input (Current protect)		25 A, AC 250 V
10	4-way valve solenoid coil	VHV-01AJ502E1	AC 220 – 240 V
11	Compressor thermo. (Protection)	US-622	ON : 90 ± 5°C, OFF : 125 ± 4°C

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RAV-SM1400AT-E (A03-003)

No.	Parts name	Type	Specifications
1	Fan motor	ICF-140-63-2	Output (Rated) 63 W
2	Compressor	DA420A3F-21M	3 phase, 4P, 3500 W
3	Reactor	CH-56	6 mH, 18.5 A
4	Outdoor temp. sensor (To-sensor)	—	10 kΩ at 25°C
5	Heat exchanger sensor (Te-sensor)	—	10 kΩ at 25°C
6	Suction temp. sensor (Ts-sensor)	—	10 kΩ at 25°C
7	Discharge temp. sensor (Td-sensor)	—	50 kΩ at 25°C
8	Fuse (Switching power (Protect))		T3.15 A, AC 250 V
9	Fuse (Inverter, input (Current protect))		25 A, AC 250 V
10	4-way valve solenoid coil	VHV-01AJ502E1	AC 220 – 240 V
11	Compressor thermo. (Protection)	US-622	ON : 90 ± 5°C, OFF : 125 ± 4°C

RAV-SP560AT-E, RAV-SP800AT-E (A03-014)

No.	Parts name	Type	Specifications
1	Fan motor	ICF-140-63-2	Output (Rated) 63 W
2	Compressor	DA220A2F-20L	3 phase, 4P, 2000 W
3	Reactor	CH-47	8 mH, 16 A
4	Outdoor temp. sensor (To-sensor)	—	10 kΩ at 25°C
5	Heat exchanger sensor (Te-sensor)	—	10 kΩ at 25°C
6	Suction temp. sensor (Ts-sensor)	—	10 kΩ at 25°C
7	Discharge temp. sensor (Td-sensor)	—	50 kΩ at 25°C
8	Fuse (Switching power (Protect))		T3.15 A, AC 250 V
9	Fuse (Inverter, input (Current protect))		25 A, AC 250 V
10	4-way valve solenoid coil	VHV-01AJ503C1	
11	Compressor thermo. (Protection)	US-622	ON : 90 ± 5°C, OFF : 125 ± 4°C
12	Coil (Pulse Modulating Valve)	DKV-M0ZS743B0	
13	Reactor	CH-43	10 mH, 1 A

RAV-SP1100AT-E, RAV-SP1400AT-E (A03-014)

No.	Parts name	Type	Specifications
1	Fan motor	ICF-140-63-2	Output (Rated) 63 W
2	Compressor	DA420A3F-21M	3 phase, 4P, 3500 W
3	Reactor	CH-56	6 mH, 18.5 A
4	Outdoor temp. sensor (To-sensor)	—	10 kΩ at 25°C
5	Heat exchanger sensor (Te-sensor)	—	10 kΩ at 25°C
6	Suction temp. sensor (Ts-sensor)	—	10 kΩ at 25°C
7	Discharge temp. sensor (Td-sensor)	—	50 kΩ at 25°C
8	Fuse (Switching power (Protect))		T3.15 A, AC 250 V
9	Fuse (Inverter, input (Current protect))		25 A, AC 250 V
10	4-way valve solenoid coil	VHV-01AJ502E1	AC 220 V
11	Compressor thermo. (Protection)	US-622	ON : 90 ± 5°C, OFF : 125 ± 4°C
12	Coil (Pulse Modulating Valve)	UKV-U011E	

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6-3. Accessory Separate Soldparts

TCB-DP22CE (Drain up kit) (A03-016)
RAV-SM561CT-E, RAV-SM801CT-E, RAV-SM1101CT-E, RAV-SM1401CT-E

No.	Parts name	Type	Specifications
1	Float switch	FS-0218-106	
2	Drain pump motor	ADP-1406 or ADP-1415	

RBC-U21PG (W) E (Ceiling panel) (A02-014, A03-003, A03-014)
RAV-SM560AT-E, RAV-SM1100AT-E, RAV-SM560UT-E, RAV-SM1100UT-E, RAV-SM560BT-E
RAV-SP1100UT-E

No.	Parts name	Type	Specifications
1	Motor-louver	MP24GA	DC 12 V
2			

TCB-DP11E (Drain up pump) (A02-014)
RAV-SM560AT-E, RAV-SM560UT-E, RAV-SM560BT-E

No.	Parts name	Type	Specifications
1	Pump-drain	PJD-05230TF-1	AC 220–240 V
2			

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7. REFRIGERANT R410A

This air conditioner adopts the new refrigerant HFC (R410A) which does not damage the ozone layer.

The working pressure of the new refrigerant R410A is 1.6 times higher than conventional refrigerant (R22). The refrigerating oil is also changed in accordance with change of refrigerant, so be careful that water, dust, and existing refrigerant or refrigerating oil are not entered in the refrigerant cycle of the air conditioner using the new refrigerant during installation work or servicing time.

The next section describes the precautions for air conditioner using the new refrigerant. Conforming to contents of the next section together with the general cautions included in this manual, perform the correct and safe work.

7-1. Safety During Installation/Servicing

As R410A's pressure is about 1.6 times higher than that of R22, improper installation/servicing may cause a serious trouble. By using tools and materials exclusive for R410A, it is necessary to carry out installation/servicing safely while taking the following precautions into consideration.

(1) Never use refrigerant other than R410A in an air conditioner which is designed to operate with R410A.

If other refrigerant than R410A is mixed, pressure in the refrigeration cycle becomes abnormally high, and it may cause personal injury, etc. by a rupture.

(2) Confirm the used refrigerant name, and use tools and materials exclusive for the refrigerant R410A.

The refrigerant name R410A is indicated on the visible place of the outdoor unit of the air conditioner using R410A as refrigerant. To prevent mischarging, the diameter of the service port differs from that of R22.

(3) If a refrigeration gas leakage occurs during installation/servicing, be sure to ventilate fully.

If the refrigerant gas comes into contact with fire, a poisonous gas may occur.

(4) When installing or removing an air conditioner, do not allow air or moisture to remain in the refrigeration cycle. Otherwise, pressure in the refrigeration cycle may become abnormally high so that a rupture or personal injury may be caused.

(5) After completion of installation work, check to make sure that there is no refrigeration gas leakage.

If the refrigerant gas leaks into the room, coming into contact with fire in the fan-driven heater, space heater, etc., a poisonous gas may occur.

(6) When an air conditioning system charged with a large volume of refrigerant is installed in a small room, it is necessary to exercise care so that, even when refrigerant leaks, its concentration does not exceed the marginal level.

If the refrigerant gas leakage occurs and its concentration exceeds the marginal level, an oxygen starvation accident may result.

(7) Be sure to carry out installation or removal according to the installation manual.

Improper installation may cause refrigeration trouble, water leakage, electric shock, fire, etc.

(8) Unauthorized modifications to the air conditioner may be dangerous. If a breakdown occurs please call a qualified air conditioner technician or electrician.

Improper repair's may result in water leakage, electric shock and fire, etc.

7-2. Refrigerant Piping Installation

7-2-1. Piping Materials and Joints Used

For the refrigerant piping installation, copper pipes and joints are mainly used. Copper pipes and joints suitable for the refrigerant must be chosen and installed. Furthermore, it is necessary to use clean copper pipes and joints whose interior surfaces are less affected by contaminants.

(1) Copper Pipes

It is necessary to use seamless copper pipes which are made of either copper or copper alloy and it is desirable that the amount of residual oil is less than 40 mg/10 m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants.

As an air conditioner using R410A incurs pressure higher than when using R22, it is necessary to choose adequate materials.

Thicknesses of copper pipes used with R410A are as shown in Table 7-2-1. Never use copper pipes thinner than 0.8 mm even when it is available on the market.

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Table 7-2-1 Thicknesses of annealed copper pipes

		Thickness (mm)	
Nominal diameter	**Outer diameter (mm)**	**R410A**	**R22**
1/4	6.35	0.80	0.80
3/8	9.52	0.80	0.80
1/2	12.70	0.80	0.80
5/8	15.88	1.00	1.00

(2) Joints

For copper pipes, flare joints or socket joints are used. Prior to use, be sure to remove all contaminants.

a) Flare Joints

Flare joints used to connect the copper pipes cannot be used for pipings whose outer diameter exceeds 20 mm. In such a case, socket joints can be used.

Sizes of flare pipe ends, flare joint ends and flare nuts are as shown in Tables 7-2-3 to 7-2-6 below.

b) Socket Joints

Socket joints are such that they are brazed for connections, and used mainly for thick pipings whose diameter is larger than 20 mm. Thicknesses of socket joints are as shown in Table 7-2-2.

Table 7-2-2 Minimum thicknesses of socket joints

Nominal diameter	Reference outer diameter of copper pipe jointed (mm)	Minimum joint thickness (mm)
1/4	6.35	0.50
3/8	9.52	0.60
1/2	12.70	0.70
5/8	15.88	0.80

7-2-2. Processing of Piping Materials

When performing the refrigerant piping installation, care should be taken to ensure that water or dust does not enter the pipe interior, that no other oil other than lubricating oils used in the installed air conditioner is used, and that refrigerant does not leak. When using lubricating oils in the piping processing, use such lubricating oils whose water content has been removed. When stored, be sure to seal the container with an airtight cap or any other cover.

(1) Flare Processing Procedures and Precautions

a) Cutting the Pipe

By means of a pipe cutter, slowly cut the pipe so that it is not deformed.

b) Removing Burrs and Chips

If the flared section has chips or burrs, refrigerant leakage may occur. Carefully remove all burrs and clean the cut surface before installation.

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c) Insertion of Flare Nut

d) Flare Processing

Make certain that a clamp bar and copper pipe have been cleaned.

By means of the clamp bar, perform the flare processing correctly.

Use either a flare tool for R410A or conventional flare tool.

Flare processing dimensions differ according to the type of flare tool. When using a conventional flare tool, be sure to secure “dimension A” by using a gauge for size adjustment.

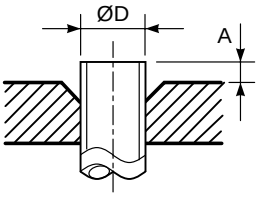

Fig. 7-2-1 Flare processing dimensions

Table 7-2-3 Dimensions related to flare processing for R410A

Nominal diameter	Outer diameter (mm)	Thickness (mm)	A (mm)		
			Flare tool for R410A clutch type	Conventional flare tool	
				Clutch type	Wing nut type
1/4	6.35	0.8	0 to 0.5	1.0 to 1.5	1.5 to 2.0
3/8	9.52	0.8	0 to 0.5	1.0 to 1.5	1.5 to 2.0
1/2	12.70	0.8	0 to 0.5	1.0 to 1.5	2.0 to 2.5
5/8	15.88	1.0	0 to 0.5	1.0 to 1.5	2.0 to 2.5

Table 7-2-4 Dimensions related to flare processing for R22

Nominal diameter	Outer diameter (mm)	Thickness (mm)	A (mm)		
			Flare tool for R22 clutch type	Conventional flare tool	
				Clutch type	Wing nut type
1/4	6.35	0.8	0 to 0.5	0.5 to 1.0	1.0 to 1.5
3/8	9.52	0.8	0 to 0.5	0.5 to 1.0	1.0 to 1.5
1/2	12.70	0.8	0 to 0.5	0.5 to 1.0	1.5 to 2.0
5/8	15.88	1.0	0 to 0.5	0.5 to 1.0	1.5 to 2.0

Table 7-2-5 Flare and flare nut dimensions for R410A

Nominal diameter	Outer diameter (mm)	Thickness (mm)	Dimension (mm)				Flare nut width (mm)
			A	B	C	D	
1/4	6.35	0.8	9.1	9.2	6.5	13	17
3/8	9.52	0.8	13.2	13.5	9.7	20	22
1/2	12.70	0.8	16.6	16.0	12.9	23	26
5/8	15,88	1.0	19.7	19.0	16.0	25	29

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Table 7-2-6 Flare and flare nut dimensions for R22

Nominal diameter	Outer diameter (mm)	Thickness (mm)	Dimension (mm)				Flare nut width (mm)
			A	B	C	D	
1/4	6.35	0.8	9.0	9.2	6.5	13	17
3/8	9.52	0.8	13.0	13.5	9.7	20	22
1/2	12.70	0.8	16.2	16.0	12.9	20	24
5/8	15.88	1.0	19.4	19.0	16.0	23	27
3/4	19.05	1.0	23.3	24.0	19.2	34	36

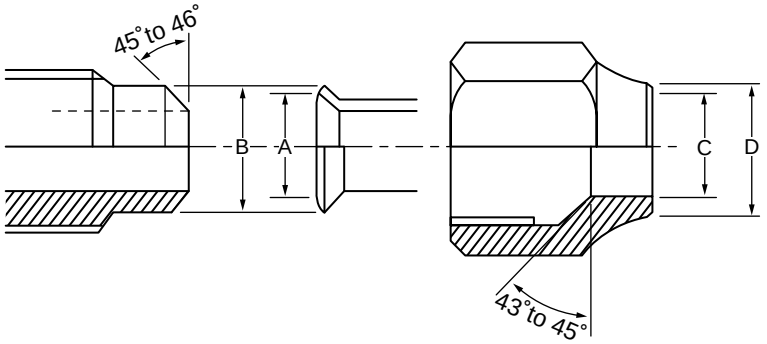

Fig. 7-2-2 Relations between flare nut and flare seal surface

(2) Flare Connecting Procedures and Precautions

a) Make sure that the flare and union portions do not have any scar or dust, etc.

b) Correctly align the processed flare surface with the union axis.

c) Tighten the flare with designated torque by means of a torque wrench. The tightening torque for R410A is the same as that for conventional R22. Incidentally, when the torque is weak, the gas leakage may occur. When it is strong, the flare nut may crack and may be made non-removable. When choosing the tightening torque, comply with values designated by manufacturers. Table 7-2-7 shows reference values.

NOTE:

When applying oil to the flare surface, be sure to use oil designated by the manufacturer. If any other oil is used, the lubricating oils may deteriorate and cause the compressor to burn out.

Table 7-2-7 Tightening torque of flare for R410A [Reference values]

Nominal diameter	Outer diameter (mm)	Tightening torque N•m (kgf•cm)	Tightening torque of torque wrenches available on the market N•m (kgf•cm)
1/4	6.35	14 to 18 (140 to 180)	16 (160), 18 (180)
3/8	9.52	33 to 42 (330 to 420)	42 (420)
1/2	12.70	50 to 62 (500 to 620)	55 (550)
5/8	15.88	63 to 77 (630 to 770)	65 (650)

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7-3. Tools

7-3-1. Required Tools

The service port diameter of packed valve of the outdoor unit in the air conditioner using R410A is changed to prevent mixing of other refrigerant. To reinforce the pressure-resisting strength, flare processing dimensions and opposite side dimension of flare nut (For Ø12.7 copper pipe) of the refrigerant piping are lengthened.

The used refrigerating oil is changed, and mixing of oil may cause a trouble such as generation of sludge, clogging of capillary, etc. Accordingly, the tools to be used are classified into the following three types.

(1) Tools exclusive for R410A (Those which cannot be used for conventional refrigerant (R22))

(2) Tools exclusive for R410A, but can be also used for conventional refrigerant (R22)

(3) Tools commonly used for R410A and for conventional refrigerant (R22)

The table below shows the tools exclusive for R410A and their interchangeability.

Tools exclusive for R410A (The following tools for R410A are required.)

Tools whose specifications are changed for R410A and their interchangeability

No.	Used tool	Usage	R410A air conditioner installation		Conventional air conditioner installation
			Existence of new equipment for R410A	Whether conventional equipment can be used	Whether new equipment can be used with conventional refrigerant
①	Flare tool	Pipe flaring	Yes	*(Note 1)	○
②	Copper pipe gauge for adjusting projection margin	Flaring by conventional flare tool	Yes	*(Note 1)	*(Note 1)
③	Torque wrench	Connection of flare nut	Yes	×	×
④	Gauge manifold	Evacuating, refrigerant charge, run check, etc.	Yes	×	×
⑤	Charge hose				
⑥	Vacuum pump adapter	Vacuum evacuating	Yes	×	○
⑦	Electronic balance for refrigerant charging	Refrigerant charge	Yes	×	○
⑧	Refrigerant cylinder	Refrigerant charge	Yes	×	×
⑨	Leakage detector	Gas leakage check	Yes	×	○
⑩	Charging cylinder	Refrigerant charge	(Note 2)	×	×

(Note 1) When flaring is carried out for R410A using the conventional flare tools, adjustment of projection margin is necessary. For this adjustment, a copper pipe gauge, etc. are necessary.

(Note 2) Charging cylinder for R410A is being currently developed.

General tools (Conventional tools can be used.)

In addition to the above exclusive tools, the following equipments which serve also for R22 are necessary as the general tools.

(1) Vacuum pump
Use vacuum pump by attaching vacuum pump adapter.
(2) Torque wrench
(3) Pipe cutter
(4) Reamer
(5) Pipe bender
(6) Level vial
(7) Screwdriver (+, –)
(8) Spanner or Monkey wrench
(9) Hole core drill (Ø65)
(10) Hexagon wrench (Opposite side 4mm)
(11) Tape measure
(12) Metal saw

Also prepare the following equipments for other installation method and run check.

(1) Clamp meter
(2) Thermometer
(3) Insulation resistance tester
(4) Electroscope

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7-4. Recharging of Refrigerant

When it is necessary to recharge refrigerant, charge the specified amount of new refrigerant according to the following steps.

Recover the refrigerant, and check no refrigerant remains in the equipment.

↓

Connect the charge hose to packed valve service port at the outdoor unit's gas side.

↓

Connect the charge hose of the vacuum pump adapter.

↓

Open fully both packed valves at liquid and gas sides.

↓

Place the handle of the gauge manifold Low in the fully opened position, and turn on the vacuum pump's power switch. Then, evacuating the refrigerant in the cycle.

↓

When the compound gauge's pointer has indicated –0.1 Mpa (–76 cmHg), place the handle Low in the fully closed position, and turn off the vacuum pump's power switch.

↓

Keep the status as it is for 1 to 2 minutes, and ensure that the compound gauge's pointer does not return.

↓

Set the refrigerant cylinder to the electronic balance, connect the connecting hose to the cylinder and the connecting port of the electronic balance, and charge **liquid refrigerant.**

(For refrigerant charging, see the figure below.)

① Never charge refrigerant exceeding the specified amount.

② If the specified amount of refrigerant cannot be charged, charge refrigerant **bit by bit** in COOL mode.

③ Do not carry out additional charging.

When additional charging is carried out if refrigerant leaks, the refrigerant composition changes in the refrigeration cycle, that is characteristics of the air conditioner changes, refrigerant exceeding the specified amount is charged, and working pressure in the refrigeration cycle becomes abnormally high pressure, and may cause a rupture or personal injury.

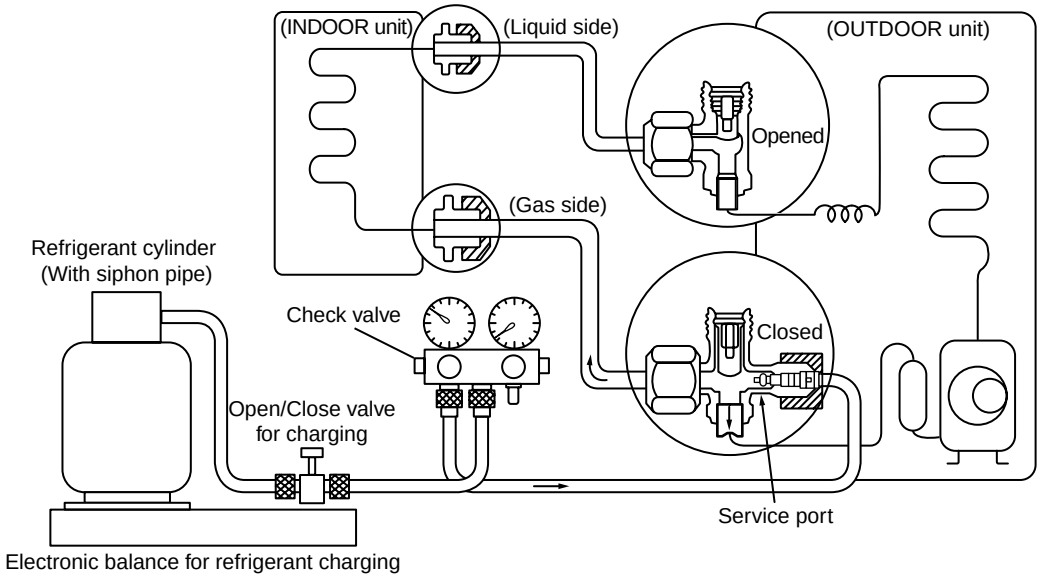

Fig. 7-4-1 Configuration of refrigerant charging

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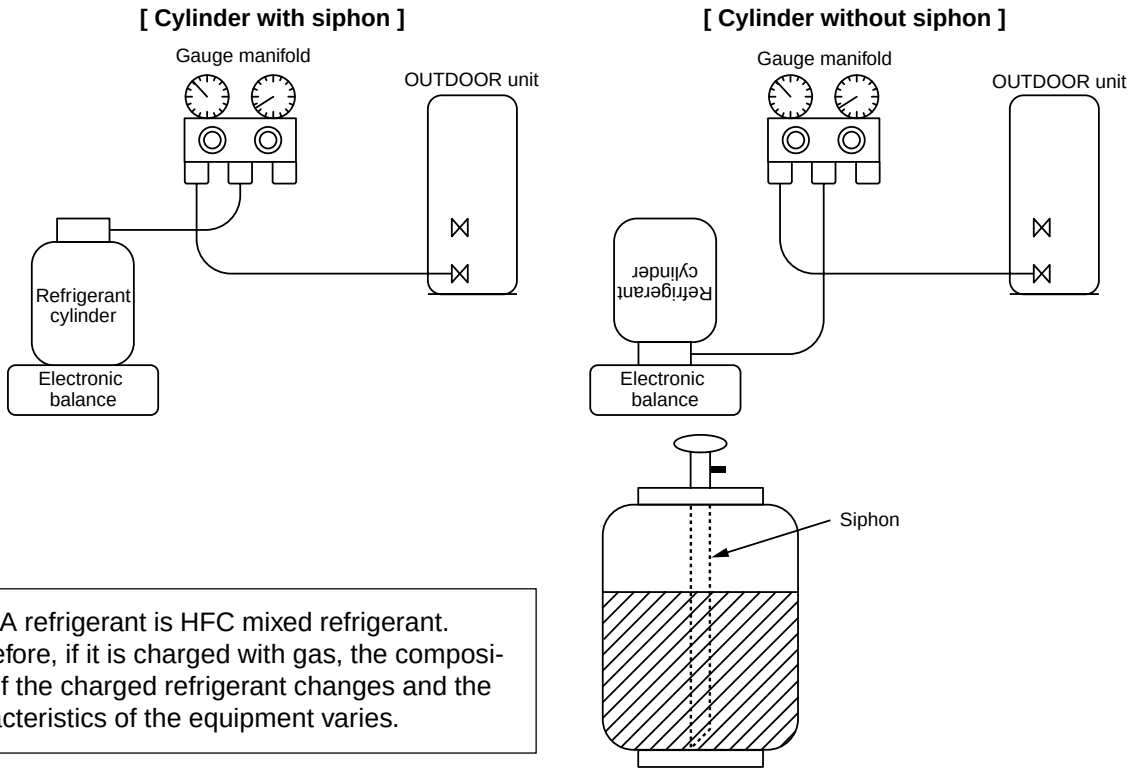
① Be sure to make setting so that **liquid** can be charged.
② When using a cylinder equipped with a siphon, liquid can be charged without turning it upside down.

It is necessary for charging refrigerant under condition of liquid because R410A is mixed type of refrigerant. Accordingly, when charging refrigerant from the refrigerant cylinder to the equipment, charge it turning the cylinder upside down if cylinder is not equipped with siphon.



R410A refrigerant is HFC mixed refrigerant. Therefore, if it is charged with gas, the composition of the charged refrigerant changes and the characteristics of the equipment varies.

Fig. 7-4-2

7-5. Brazing of Pipes

7-5-1. Materials for Brazing

(1) Silver brazing filler

Silver brazing filler is an alloy mainly composed of silver and copper. It is used to join iron, copper or copper alloy, and is relatively expensive though it excels in solderability.

(2) Phosphor bronze brazing filler

Phosphor bronze brazing filler is generally used to join copper or copper alloy.

(3) Low temperature brazing filler

Low temperature brazing filler is generally called solder, and is an alloy of tin and lead. Since it is weak in adhesive strength, do not use it for refrigerant pipes.

① Phosphor bronze brazing filler tends to react with sulfur and produce a fragile compound water solution, which may cause a gas leakage. Therefore, use any other type of brazing filler at a hot spring resort, etc., and coat the surface with a paint.
② When performing brazing again at time of servicing, use the same type of brazing filler.

7-5-2. Flux

(1) Reason why flux is necessary

- By removing the oxide film and any foreign matter on the metal surface, it assists the flow of brazing filler.
- In the brazing process, it prevents the metal surface from being oxidized.
- By reducing the brazing filler's surface tension, the brazing filler adheres better to the treated metal.

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(2) Characteristics required for flux

- Activated temperature of flux coincides with the brazing temperature.
- Due to a wide effective temperature range, flux is hard to carbonize.
- It is easy to remove slag after brazing.
- The corrosive action to the treated metal and brazing filler is minimum.
- It excels in coating performance and is harmless to the human body.

As the flux works in a complicated manner as described above, it is necessary to select an adequate type of flux according to the type and shape of treated metal, type of brazing filler and brazing method, etc.

(3) Types of flux

- **Noncorrosive flux**

  Generally, it is a compound of borax and boric acid.
  It is effective in case where the brazing temperature is higher than 800°C.

- **Activated flux**

  Most of fluxes generally used for silver brazing are this type.
  It features an increased oxide film removing capability due to the addition of compounds such as potassium fluoride, potassium chloride and sodium fluoride to the borax-boric acid compound.

(4) Piping materials for brazing and used brazing filler/flux

Piping material	Used brazing filler	Used flux
Copper - Copper	Phosphor copper	Do not use
Copper - Iron	Silver	Paste flux
Iron - Iron	Silver	Vapor flux

① Do not enter flux into the refrigeration cycle.
② When chlorine contained in the flux remains within the pipe, the lubricating oil deteriorates. Therefore, use a flux which does not contain chlorine.
③ When adding water to the flux, use water which does not contain chlorine (e.g. distilled water or ion-exchange water).
④ Remove the flux after brazing.

7-5-3. Brazing

As brazing work requires sophisticated techniques, experiences based upon a theoretical knowledge, it must be performed by a person qualified.

In order to prevent the oxide film from occurring in the pipe interior during brazing, it is effective to proceed with brazing while letting dry Nitrogen gas (N2) flow.

Never use gas other than Nitrogen gas.

(1) Brazing method to prevent oxidation

① Attach a reducing valve and a flow-meter to the Nitrogen gas cylinder.
② Use a copper pipe to direct the piping material, and attach a flow-meter to the cylinder.
③ Apply a seal onto the clearance between the piping material and inserted copper pipe for Nitrogen in order to prevent backflow of the Nitrogen gas.
④ When the Nitrogen gas is flowing, be sure to keep the piping end open.
⑤ Adjust the flow rate of Nitrogen gas so that it is lower than 0.05 m³/Hr or 0.02 MPa (0.2kgf/cm²) by means of the reducing valve.
⑥ After performing the steps above, keep the Nitrogen gas flowing until the pipe cools down to a certain extent (temperature at which pipes are touchable with hands).
⑦ Remove the flux completely after brazing.

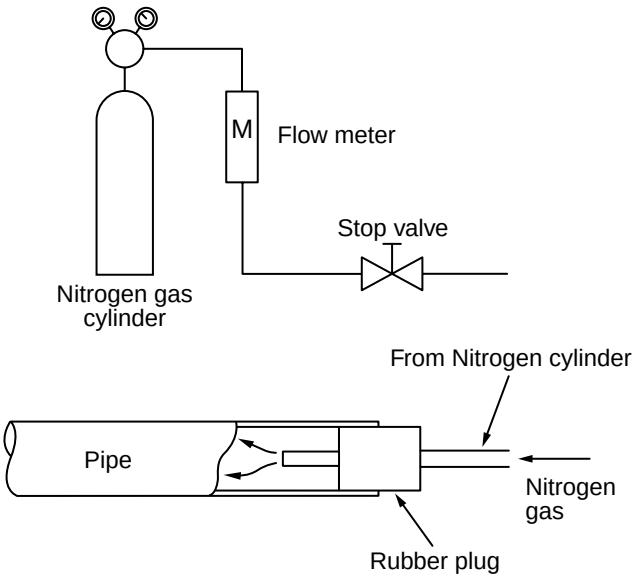

Fig. 7-5-1 Prevention of oxidation during brazing

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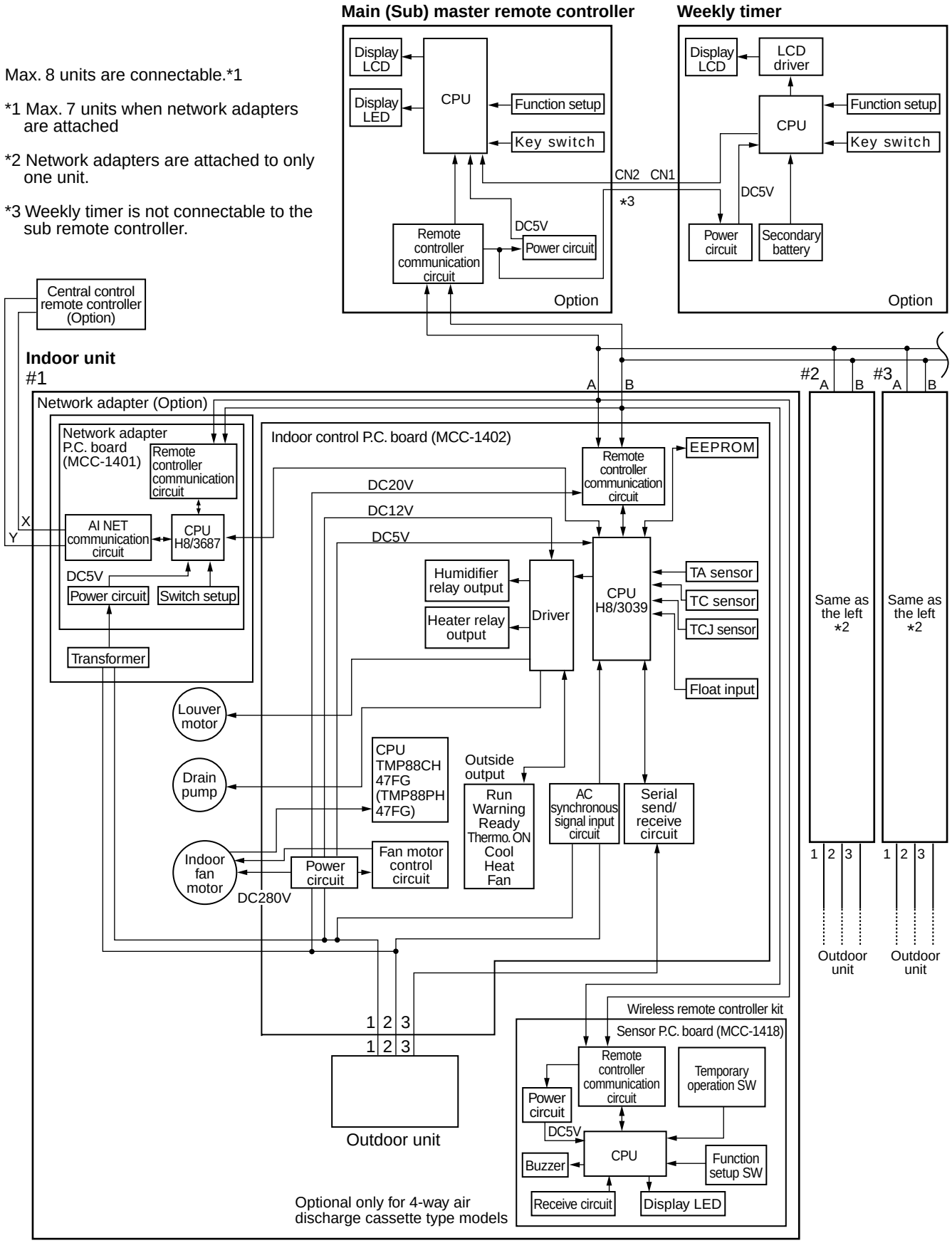
8. CONTROL BLOCK DIAGRAM

8-1. Indoor Control Circuit

RAV-SM560UT-E, RAV-SM560BT-E, RAV-SM800UT-E, RAV-SM800BT-E (A02-014)
RAV-SP1100UT-E (A03-014)



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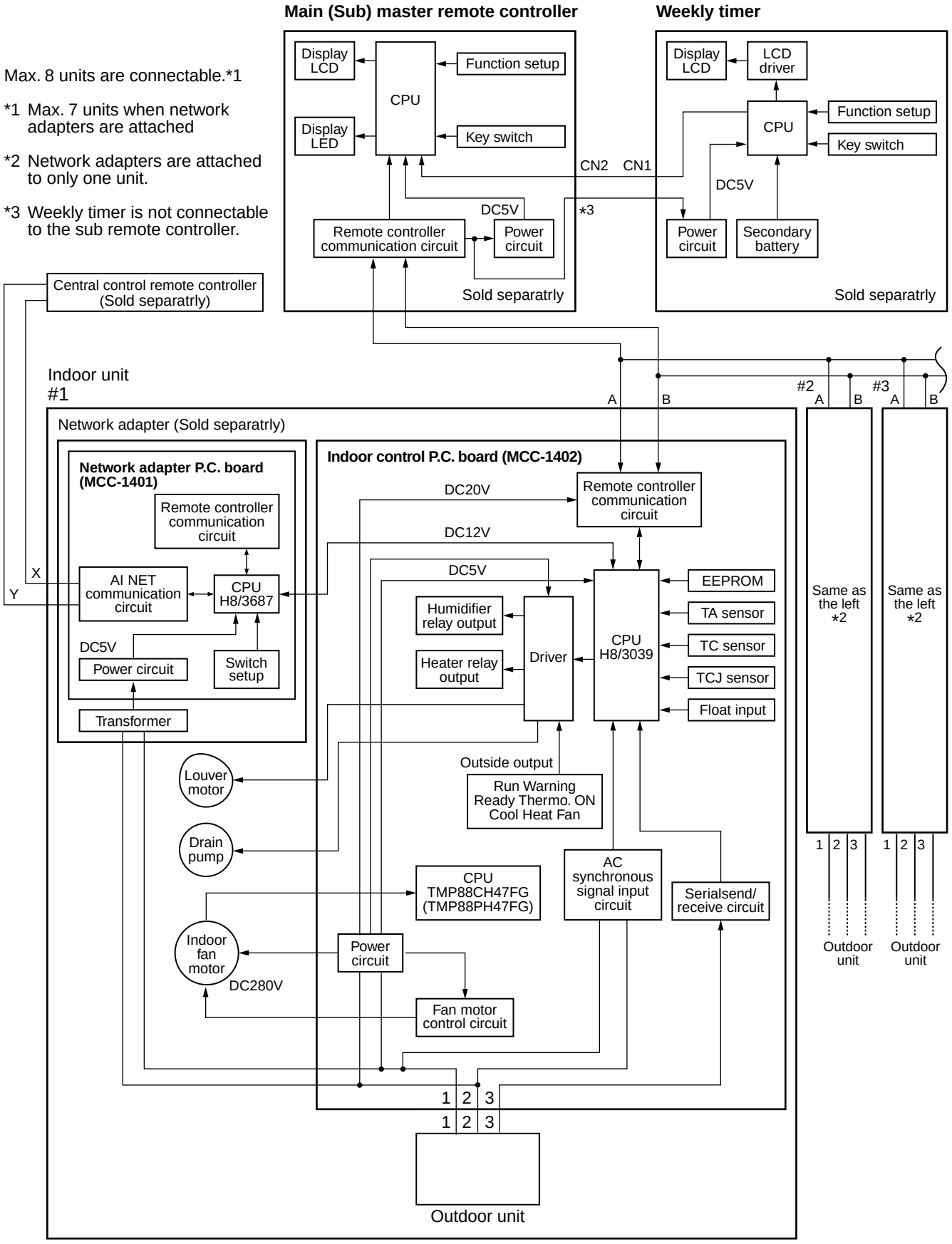
RAV-SM561BT-E, RAV-SM801BT-E, RAV-SM1101BT-E, RAV-SM1401BT-E (A03-007)

Max. 8 units are connectable.*1

*1 Max. 7 units when network adapters are attached

*2 Network adapters are attached to only one unit.

*3 Weekly timer is not connectable to the sub remote controller.



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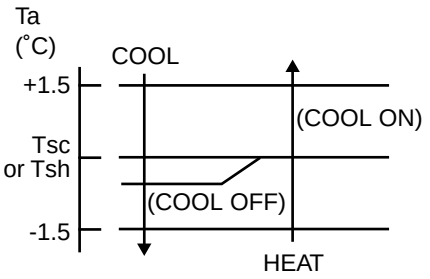
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

8-2. Control Specifications

RAV-SM560UT-E, RAV-SM560BT-E, RAV-SM800UT-E, RAV-SM800BT-E (A02-014)

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>1</td><td>When power supply is reset</td><td>1) Distinction of outdoor units
When the power supply is reset, the outdoors are distinguished, and control is exchanged according to the distinguished result.
2) Setting of speed of the indoor fan/setting whether to adjust air direction or not.
(Only 4-way models)
Based on EEPROM data, speed of the indoor fan or setting whether to adjust air direction or not is selected.</td><td>Air speed/
Air direction adjustment</td></tr>
<tr><td>2</td><td>Operation mode selection</td><td>1) Based on the operation mode selecting command from the remote controller, the operation mode is selected.
<table>
<tr><th>Remote controller command</th><th>Outline of control</th></tr>
<tr><td>STOP</td><td>Air conditioner stops.</td></tr>
<tr><td>FAN</td><td>Fan operation</td></tr>
<tr><td>COOL</td><td>Cooling operation</td></tr>
<tr><td>DRY</td><td>Dry operation</td></tr>
<tr><td>HEAT</td><td>Heating operation</td></tr>
<tr><td>AUTO</td><td>• COOL/HEAT operation mode is automatically selected by Ta and Ts for operation.</td></tr>
</table>


1) Judge the selection of COOL/HEAT mode as shown in the figure above.
When 10 minutes passed after thermostat had been turned off, the heating operation (Thermo OFF) is exchanged to cooling operation if Tsh exceeds +1.5 or more.
(COOL OFF) and (COOL ON) in the figure indicate an example.
When 10 minutes passed after thermostat had been turned off, the cooling operation (Thermo OFF) is exchanged to heating operation if Tsc exceeds –1.5 or less.
2) For the automatic capacity control after judgment of COOL/HEAT, refer to item 4.
3) For the temperature correction of room temperature control in automatic heating operation, refer to item 3.</td><td>Ta : Room temperature
Ts : Setup temperature
Tsc : Setup temperature in cooling operation
Tsh : Setup temperature + Room temperature control temperature compensation</td></tr>
</table>

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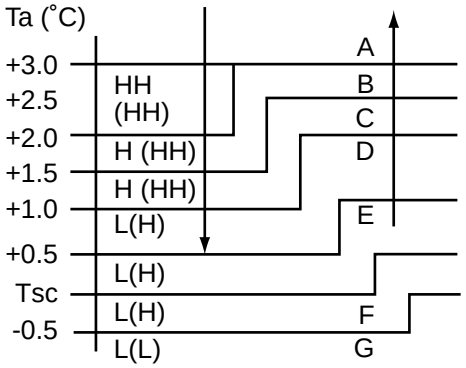
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>3</td><td>Room temperature control</td><td>1) Adjustment range Remote controller setup temperature (°C)
<table>
<tr><th></th><th>COOL/ DRY</th><th>Heating operation</th><th>Auto operation</th></tr>
<tr><td>Wired type</td><td>18 to 29</td><td>18 to 29</td><td>18 to 29</td></tr>
<tr><td>Wireless type*</td><td>18 to 30</td><td>16 to 30</td><td>17 to 27</td></tr>
</table>
* : Only for 4-way air discharge cassette type
2) Using the item code 06, the setup temperature in heating operation can be compensated.
<table>
<tr><td>Setup data</td><td>0</td><td>2</td><td>4</td><td>6</td></tr>
<tr><td>Setup temp. compensation</td><td>+0°C</td><td>+2°C</td><td>+4°C</td><td>+6°C</td></tr>
</table>
Setting at shipment
<table>
<tr><td>Setup data</td><td>2</td></tr>
</table></td><td>Shift of suction temperature in heating operation</td></tr>
<tr><td>4</td><td>Automatic capacity control (GA control)</td><td>1) Based on the difference between Ta and Ts, the operation frequency is instructed to the outdoor unit.</td><td></td></tr>
<tr><td>5</td><td>Air speed selection</td><td>1) Operation with (HH), (H), (L), or [AUTO] mode is performed by the command from the remote controller.
2) When the air speed mode [AUTO] is selected, the air speed varies by the difference between Ta and Ts.
<COOL>
 

• Controlling operation in case when thermo of remote controller works is same as a case when thermo of the body works.
• If the air speed has been changed once, it is not changed for 3 minutes. However when the air volume is exchanged, the air speed changes.
• When cooling operation has started, the air speed selects a downward slope, that is, the high position.
• If the temperature is just on the difference boundary, the air speed does not change.
• Mode in the parentheses indicates one in automatic cooling operation.</td><td>HH > H > L > LL</td></tr>
</table>

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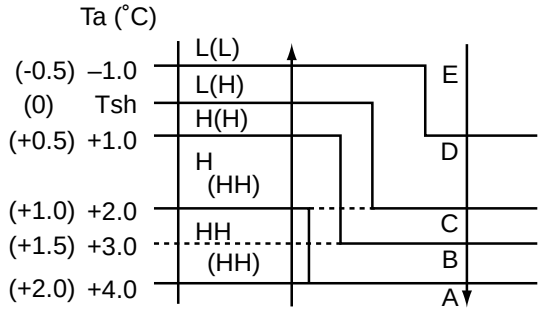
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Item	Outline of specifications	Remarks
5	Air speed selection (Continued)	**<HEAT>**	



Value in the parentheses indicates one when thermostat of the remote controller works.

Value without parentheses indicates one when thermostat of the body works.

- If the air speed has been changed once, it is not changed for 1 minute. However when the air speed is exchanged, the air speed changes.
- When heating operation has started, the air speed selects a upward slope, that is, the high position.
- If the temperature is just on the difference boundary, the air speed does not change.
- Mode in the parentheses indicates one in automatic heating operation.
- In Tc ≥ 60°C, the air speed increases by 1 step.

<Operation of duct only>

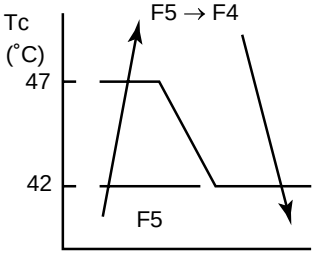
Standard		High ceiling		Tap	SM560	SM800
COOL	HEAT	COOL	HEAT		Revolutions per minute (rpm)	
UL	UL			FD	320	320
L				FD	320	330
L+	L			FB	330	340
	L+			FA	350	360
M				F9	360	370
	M	UL	UL	F8	370	380
M+	M+	L	L	F7	400	410
H		L+	L+	F6	410	440
	H			F5	420	450
				F4	440	480
		M+,M	M+,M	F3	480	500
				F2	530	540
		H	H	F1	580	580

Tap	Air volume setup		SM1100	SM1400
	COOL, DRY, FAN	HEAT	Revolutions per minute (rpm)	
F4		UH	530	660
F5		H	510	660
F6	H		500	620
F7	M+	M+	470	570
F8		M	450	520
F9	M		440	510
FA		L+	410	470
FB	L+	L	390	430
FC	L		380	420
FD		UL	320	370

Tc: Indoor heat exchanger sensor temperature

3) In heating operation, the mode changes to [UL] if thermostat is turned off.
4) If Ta ≥ 25°C when heating operation has started and when defrost operation has been cleared, it operates with HIGH (H) mode or (HH) for 1 minute from when Tc has entered in E zone of cool air discharge preventive control (Item 6).
5) In automatic cooling/heating operation, the revolution frequency of [HH] is set larger than that in the standard cooling/heating operation. However the revolution frequency is restricted in the automatic heating operation as shown in the following figure.

[PRE-HEAT] display



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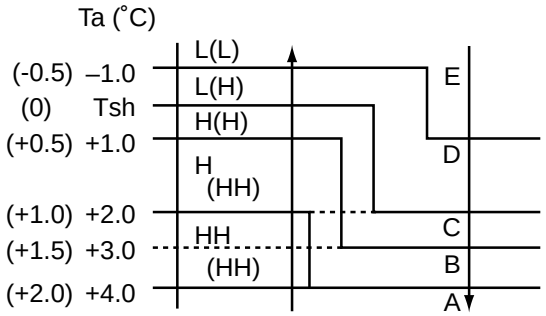
No.	Item	Outline of specifications	Remarks
5	Air speed selection (Continued)	**<HEAT>**	



Value in the parentheses indicates one when thermostat of the remote controller works.

Value without parentheses indicates one when thermostat of the body works.

- If the air speed has been changed once, it is not changed for 1 minute. However when the air speed is exchanged, the air speed changes.
- When heating operation has started, the air speed selects a upward slope, that is, the high position.
- If the temperature is just on the difference boundary, the air speed does not change.
- Mode in the parentheses indicates one in automatic heating operation.
- In Tc ≥ 60°C, the air speed increases by 1 step.

Tc: Indoor heat exchanger sensor temperature

<Operation of 4-way Air Discharge Cassette type only>

Tap	Standard		Type 1		Type 3		SP1100UT (rpm)
	COOL	HEAT	COOL	HEAT	COOL	HEAT	
F1					HH	HH	720
F2			HH	HH			680
F3				H+	H+, H	H+, H	640
F4			H+				580
F5		HH		H			560
F6	HH		H		L+	L+	540
F7	H+	H+			L	L	510
F8		H		L+			480
F9	H		L+	L			470
FA		L+	L				450
FB	L+	L					410
FC	L						400
FD	LL	LL	LL	LL	LL	LL	370

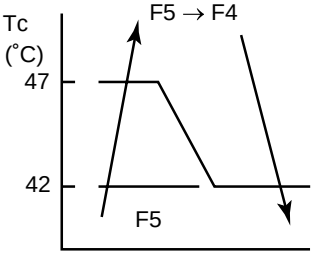
- Type 1 (0001) : High ceiling selection I
- Type 3 (0003) : High ceiling selection II
- For setup method of Type 1, Type 3, refer to 5d “Item No (DN)) table (Selection of function)” in page 71.

3) In heating operation, the mode changes to [LL] if thermostat is turned off.

[PRE-HEAT] display

4) If Ta ≥ 25°C when heating operation has started and when defrost operation has been cleared, it operates with HIGH (H) mode or (HH) for 1 minute from when Tc has entered in E zone of cool air discharge preventive control (Item 6).

5) In automatic cooling/heating operation, the revolution frequency of [HH] is set larger than that in the standard cooling/heating operation. However the revolution frequency is restricted in the automatic heating operation as shown in the following figure.



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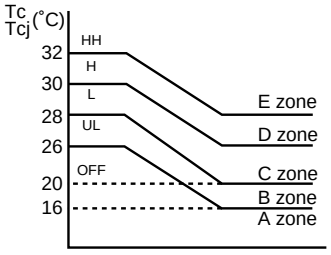
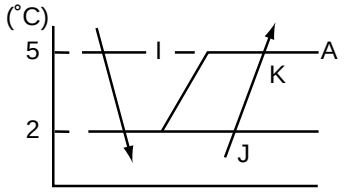
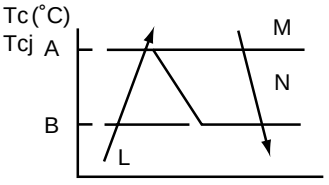
No.	Item	Outline of specifications	Remarks
6	Cool air discharge preventive control	1) In heating operation, the indoor fan is controlled based on the detected temperature of Tc sensor or Tcj sensor. As shown below, the upper limit of the revolution frequency is determined. 	In D or E zone, the priority is given to setup of air volume exchange. In A and B zones, [PRE-HEAT] is displayed.
7	Freeze preventive control (Low temperature release)	1) The cooling operation (including Dry operation) is performed as follows based on the detected temperature of Tc sensor or Tcj sensor. When [J] zone is detected for 6 minutes (Following figure), the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [J] zone. In [K] zone, time counting is interrupted and the operation is held. When [I] zone is detected, the timer is cleared and the operation returns to the normal operation. If the commanded frequency becomes S0 because the operation continues in [J] zone, the return temperature A is raised from 5°C to 12°C until [I] zone is detected and the indoor fan operates with [M] mode.  In heating operation, the freeze-preventive control works if 4-way valve is not exchanged and the condition is satisfied. (However the temperature for J zone dashing control is changed from 2°C to –5°C.)	Tcj : Indoor heat exchanger sensor temperature
8	High-temp release control	1) The heating operation is performed as follows based on the detected temperature of Tc sensor or Tcj sensor. • When [M] zone is detected, the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [M] zone. • In [N] zone, the commanded frequency is held. • When [L] zone is detected, the commanded frequency is returned to the original value by approx. 6Hz every 60 seconds. Setup at shipment **Control temp (°C)** A: 56 (54) B: 52 (52)  **NOTE :** When the operation has started or when Tc or Tcj became lower than 30°C after start of the operation, temperature is controlled between values in parentheses of A and B.	Same when thermostat is turned off.

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Item	Outline of specifications	Remarks
9	Drain pump control (For the duct, when the drain-up kit (sold separately) is mounted)	1) In cooling operation (including Dry operation), the drain pump is usually operated. 2) If the float switch operates while drain pump operates, the compressor stops, the drain pump continues the operation, and a check code is output. 3) If the float switch operates while drain pump stops, the compressor stops and the drain pump operates. If the float switch keeps operating for approx. 4 minutes, a check code is output.	Check code [P10]
10	After-heat elimination	When heating operation stops, the indoor fan operates with LOW mode for approx. 30 seconds.	
11	Flap control (For 4-way air discharge cassette type only)	1) Flap position setup • When the flap position is changed, the position moves necessarily to downward discharge position once to return to the set position. • The flap position can be set up in the following operation range. **In cooling/dry operation** **In heating/fan operation** • In group twin/triple operation, the flap positions can be set up collectively or individually. 2) Swing setup • The swinging position can be moved in the following operation range. **All modes** • In group twin/triple operation, the swinging positions can be set up collectively or individually. 3) When the unit stops or when a warning is output, the flap automatically moves downward. 4) While the heating operation is ready, the flap automatically moves upward.	**Warning :** A check code is displayed on the remote controller, and the indoor unit stops. (Excluding [F08] and [L31])

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Item	Outline of specifications	Remarks
12	Frequency fixed operation (Test run)	**<In case of wired remote controller>** 1. When pushing [CHECK] button for 4 seconds or more, [TEST] is displayed on the display screen and the mode enters in Test run mode. 2. Push [ON/OFF] button. 3. Using [MODE] button, change the mode from [COOL] to [HEAT]. • Do not use other mode than [COOL]/[HEAT] mode. • During test run operation, the temperature cannot be adjusted. • An error is detected as usual. • A frequency fixed operation is performed. 4. After the test run, push [ON/OFF] button to stop the operation. (Display in the display part is same as the procedure in item 1).) 5. Push [CHECK] button to clear the test run mode. ([TEST] display in the display part disappears and the status returns to the normal stop status.) **<In case of wireless remote controller>** **(Option for 4-way air discharge cassette type only)** 1. Turn off the power of the set. Remove the adjuster with sensors from the ceiling panel. 2. Turn Bit [1: TEST] of sensor P.C. board switch [S003] from OFF to ON. Attach the sensor P.C. board cover and mount the adjuster with sensors to the ceiling panel. Turn on the power of the set. 3. Push [ON/OFF] button of the wireless remote controller and set the operation mode to [COOL] or [HEAT] using [MODE] button. (During test run operation, all the display lamps of wireless remote controller sensors flash.) • Do not use other mode than [COOL]/[HEAT] mode. • An error is detected as usual. • A frequency fixed operation is performed. 4. After the test run, push [ON/OFF] button to stop the operation. 5. Turn off the power of the set. Turn Bit [1: TEST] of sensor P.C. board switch [S003] from ON to OFF. Mount the adjuster with sensors to the ceiling panel.	
13	Filter sign display (Except wireless type)	1) The operation time of the indoor fan is calculated, the filter reset signal is sent to the remote controller when the specified time (2500H) has passed, and it is displayed on LCD. 2) When the filter reset signal has been received from the remote controller, time of the calculation timer is cleared. In this case, the measurement time is reset if the specified time has passed, and display on LCD disappears.	[FILTER] goes on.

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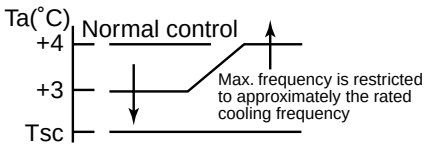
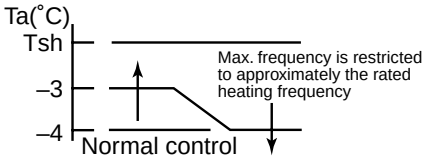
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Item	Outline of specifications	Remarks
14	Central control mode selection	1) Setting at the central controller side enables to select the contents which can be operated on the remote controller at indoor unit side. 2) **RBC-AMT21** **[Last push priority] :** The operation contents can be selected from both remote controller and central controller of the indoor unit side, and the operation is performed with the contents selected at the last. **[Center] :** Start/Stop operation only can be handled on the remote controller at indoor unit side. **[Operation Prohibited] :** It cannot be operated on the remote controller at indoor unit side. (Stop status is held.)	(No display) [CENTER] goes on. [CENTER] goes on. In a case of wireless type, the display lamp does not change. However, contents which can be operated are same. The status set in [CENTER]/ [Operation Prohibited] mode is notified with the receiving sound “Pi, Pi, Pi, Pi, Pi” (5 times).
15	Energy-save control (By connected outdoor unit)	1) Selecting [AUTO] mode enables an energy-saving to be operated. 2) The setup temperature is shifted (corrected) in the range not to lose the comfort ability according to input values of various sensors. 3) Data (Input value room temp. Ta, Outside temp. To, Air volume, Indoor heat exchanger sensor temp. Tc) for 20 minutes are taken the average to calculate correction value of the setup temperature. 4) The setup temperature is shifted every 20 minutes, and the shifted range is as follows. In cooling time : +1.5 to –1.0K In heating time : –1.5 to +1.0K	
16	Max. frequency cut control	1) This control is operated by selecting [AUTO] operation mode. 2) COOL operation mode: the frequency is controlled according to the following figure if To < 28°C.  3) HEAT operation mode: the frequency is controlled according to the right figure if To > 15°C. 	
17	DC motor (For 4-way air discharge cassette type only)	1) When the fan operation has started, positioning of the stator and the rotor are performed. (Moves slightly with tap sound) 2) The motor operates according to the command from the indoor controller. **NOTES :** • When the fan rotates while the air conditioner stops due to entering of outside air, etc, the air conditioner may operated while the fan motor stops. • When a fan locking is found, the air conditioner stops, and an error is displayed.	Check code [P12]

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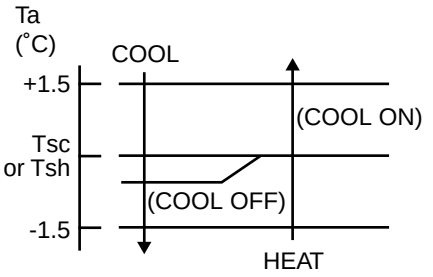
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM561BT-E, RAV-SM801BT-E, RAV-SM1101BT-E, RAV-SM1401BT-E (A03-007)

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>1</td><td>When power supply is reset</td><td>1) Distinction of outdoor units
When the power supply is reset, the outdoors are distinguished, and control is exchanged according to the distinguished result.
2) Based on EEPROM data, speed of the indoor fan or setting whether to adjust air direction or not is selected.</td><td>Air speed/
Air direction adjustment</td></tr>
<tr><td>2</td><td>Operation mode selection</td><td>1) Based on the operation mode selecting command from the remote controller, the operation mode is selected.
<table>
<tr><th>Remote controller command</th><th>Outline of control</th></tr>
<tr><td>STOP</td><td>Air conditioner stops.</td></tr>
<tr><td>FAN</td><td>Fan operation</td></tr>
<tr><td>COOL</td><td>Cooling operation</td></tr>
<tr><td>DRY</td><td>Dry operation</td></tr>
<tr><td>HEAT</td><td>Heating operation</td></tr>
<tr><td>AUTO</td><td>• COOL/HEAT operation mode is automatically selected by Ta and Ts for operation.</td></tr>
</table>


1) Judge the selection of COOL/HEAT mode as shown in the figure above.
When 10 minutes passed after thermostat had been turned off, the heating operation (Thermo OFF) is exchanged to cooling operation if Tsh exceeds +1.5 or more.
(COOL OFF) and (COOL ON) in the figure indicate an example.
When 10 minutes passed after thermostat had been turned off, the cooling operation (Thermo OFF) is exchanged to heating operation if Tsc exceeds –1.5 or less.
2) For the automatic capacity control after judgment of COOL/HEAT, refer to item 4.
3) For the temperature correction of room temperature control in automatic heating operation, refer to item 3.</td><td>Ta : Room temperature
Ts : Setup temperature
Tsc : Setup temperature in cooling operation
Tsh : Setup temperature + Room temperature control temperature compensation</td></tr>
</table>

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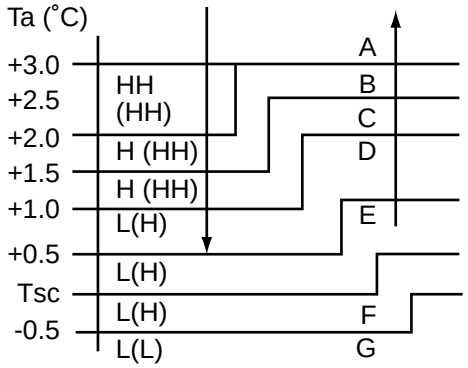
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>3</td><td>Room temperature control</td><td>1) Adjustment range Remote controller setup temperature (°C)
<table>
<tr><th></th><th>COOL/ DRY</th><th>Heating operation</th><th>Auto operation</th></tr>
<tr><td>Wired type</td><td>18 to 29</td><td>18 to 29</td><td>18 to 29</td></tr>
</table>
2) Using the item code 06, the setup temperature in heating operation can be compensated.
<table>
<tr><td>Setup data</td><td>0</td><td>2</td><td>4</td><td>6</td></tr>
<tr><td>Setup temp. compensation</td><td>+0°C</td><td>+2°C</td><td>+4°C</td><td>+6°C</td></tr>
</table>
Setting at shipment
<table>
<tr><td>Setup data</td><td>2</td></tr>
</table></td><td>Shift of suction temperature in heating operation</td></tr>
<tr><td>4</td><td>Automatic capacity control (GA control)</td><td>1) Based on the difference between Ta and Ts, the operation frequency is instructed to the outdoor unit.</td><td></td></tr>
<tr><td>5</td><td>Air speed selection</td><td>1) Operation with (HH), (H), (L), or [AUTO] mode is performed by the command from the remote controller.
2) When the air speed mode [AUTO] is selected, the air speed varies by the difference between Ta and Ts.
<COOL>
 

• Controlling operation in case when thermo of remote controller works is same as a case when thermo of the body works.
• If the air speed has been changed once, it is not changed for 3 minutes. However when the air volume is exchanged, the air speed changes.
• When cooling operation has started, the air speed selects a downward slope, that is, the high position.
• If the temperature is just on the difference boundary, the air speed does not change.
• Mode in the parentheses indicates one in automatic cooling operation.</td><td>HH > H > L > LL</td></tr>
</table>

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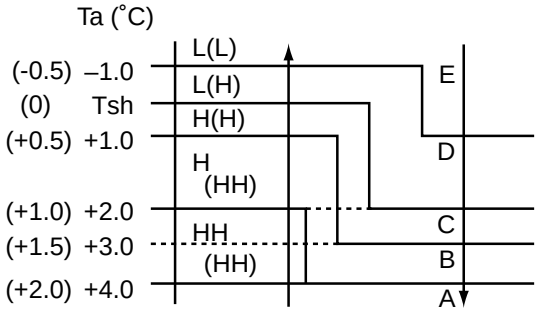
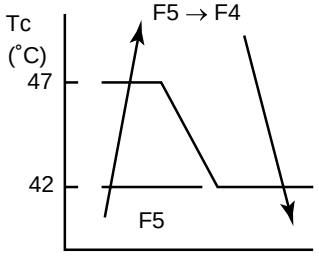
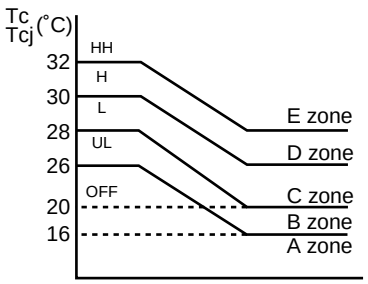
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Item	Outline of specifications	Remarks
5	Air speed selection (Continued)	**<HEAT>**  Value in the parentheses indicates one when thermostat of the remote controller works. Value without parentheses indicates one when thermostat of the body works. • If the air speed has been changed once, it is not changed for 1 minute. However when the air speed is exchanged, the air speed changes. • When heating operation has started, the air speed selects a upward slope, that is, the high position. • If the temperature is just on the difference boundary, the air speed does not change. • Mode in the parentheses indicates one in automatic heating operation. • In Tc ≥ 60°C, the air speed increases by 1 step. 3) In heating operation, the mode changes to [UL] if thermostat is turned off. 4) If Ta ≥ 25°C when heating operation has started and when defrost operation has been cleared, it operates with HIGH (H) mode or (HH) for 1 minute from when Tc has entered in E zone of cool air discharge preventive control (Item 6). 5) In automatic cooling/heating operation, the revolution frequency of [HH] is set larger than that in the standard cooling/heating operation. However the revolution frequency is restricted in the automatic heating operation as shown in the following figure.	[PRE-HEAT] display 
6	Cool air discharge preventive control	1) In heating operation, the indoor fan is controlled based on the detected temperature of Tc sensor or Tcj sensor. As shown below, the upper limit of the revolution frequency is determined.  	In D or E zone, the priority is given to setup of air volume exchange. In A and B zones, [PRE-HEAT] is displayed.

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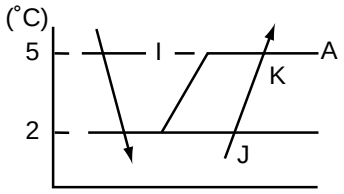
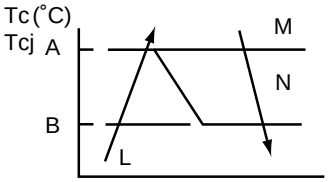
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>7</td><td>Freeze preventive control (Low temperature release)</td><td>1) The cooling operation (including Dry operation) is performed as follows based on the detected temperature of Tc sensor or Tcj sensor.
When [J] zone is detected for 6 minutes (Following figure), the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [J] zone.
In [K] zone, time counting is interrupted and the operation is held.
When [I] zone is detected, the timer is cleared and the operation returns to the normal operation.
If the commanded frequency becomes S0 because the operation continues in [J] zone, the return temperature A is raised from 5°C to 12°C until [I] zone is detected and the indoor fan operates with [M] mode.
 

In heating operation, the freeze-preventive control works if 4-way valve is not exchanged and the condition is satisfied. (However the temperature for J zone dashing control is changed from 2°C to –5°C.)</td><td>Tcj : Indoor heat exchanger sensor temperature

[M] mode :
Air speed selection</td></tr>
<tr><td>8</td><td>High-temp release control</td><td>1) The heating operation is performed as follows based on the detected temperature of Tc sensor or Tcj sensor.
• When [M] zone is detected, the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [M] zone.
• In [N] zone, the commanded frequency is held.
• When [L] zone is detected, the commanded frequency is returned to the original value by approx. 6Hz every 60 seconds.
Setup at shipment
<table><tr><th colspan="2">Control temp (°C)</th></tr><tr><td>A</td><td>B</td></tr><tr><td>56 (54)</td><td>52 (52)</td></tr></table> 

NOTE :
When the operation has started or when Tc or Tcj became lower than 30°C after start of the operation, temperature is controlled between values in parentheses of A and B.</td><td>Same when thermostat is turned off.</td></tr>
<tr><td>9</td><td>Drain pump control</td><td>1) In cooling operation (including Dry operation), the drain pump is usually operated.
2) If the float switch operates while drain pump operates, the compressor stops, the drain pump continues the operation, and a check code is output.
3) If the float switch operates while drain pump stops, the compressor stops and the drain pump operates. If the float switch keeps operating for approx. 4 minutes, a check code is output.</td><td>Check code [P10]</td></tr>
</table>

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Item	Outline of specifications	Remarks
10	DAfter-heat elimination	When heating operation stops, the indoor fan operates with LOW mode for approx. 30 seconds.	
11	Frequency fixed operation (Test run)	**<In case of wired remote controller>** 1. When pushing [CHECK] button for 4 seconds or more, [TEST] is displayed on the display screen and the mode enters in Test run mode. 2. Push [ON/OFF] button. 3. Using [MODE] button, change the mode from [COOL] to [HEAT]. • Do not use other mode than [COOL]/[HEAT] mode. • During test run operation, the temperature cannot be adjusted. • An error is detected as usual. • A frequency fixed operation is performed. 4. After the test run, push [ON/OFF] button to stop the operation. (Display in the display part is same as the procedure in item 1).) 5. Push [CHECK] button to clear the test run mode. ([TEST] display in the display part disappears and the status returns to the normal stop status.)	
12	Central control mode selection	1) Setting at the central controller side enables to select the contents which can be operated on the remote controller at indoor unit side. 2) **RBC-AMT21** **[Last push priority] :** The operation contents can be selected from both remote controller and central controller of the indoor unit side, and the operation is performed with the contents selected at the last. **[Center] :** Start/Stop operation only can be handled on the remote controller at indoor unit side. **[Operation Prohibited] :** It cannot be operated on the remote controller at indoor unit side. (Stop status is held.)	(No display) [CENTER] goes on. [CENTER] goes on. In a case of wireless type, the display lamp does not change. However, contents which can be operated are same. The status set in [CENTER]/[Operation Prohibited] mode is notified with the receiving sound “Pi, Pi, Pi, Pi, Pi” (5 times).

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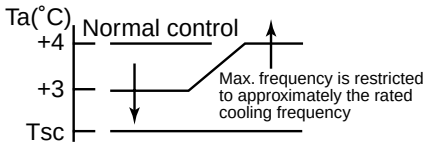
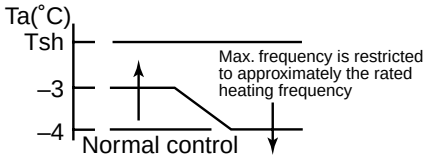
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Item	Outline of specifications	Remarks
13	Energy-save control (By connected outdoor unit)	1) Selecting [AUTO] mode enables an energy-saving to be operated. 2) The setup temperature is shifted (corrected) in the range not to lose the comfort ability according to input values of various sensors. 3) Data (Input value room temp. Ta, Outside temp. To, Air volume, Indoor heat exchanger sensor temp. Tc) for 20 minutes are taken the average to calculate correction value of the setup temperature. 4) The setup temperature is shifted every 20 minutes, and the shifted range is as follows. In cooling time : +1.5 to –1.0k In heating time : –1.5 to +1.0k	
14	Max. frequency cut control	1) This control is operated by selecting [AUTO] operation mode. 2) COOL operation mode: the frequency is controlled according to the following figure if To < 28°C.  3) HEAT operation mode: the frequency is controlled according to the right figure if To > 15°C.  	
15	DC motor	1) When the fan operation has started, positioning of the stator and the rotor are performed. (Moves slightly with tap sound) 2) The motor operates according to the command from the indoor controller. **NOTES :** • When the fan rotates while the air conditioner stops due to entering of outside air, etc, the air conditioner may operated while the fan motor stops. • When a fan locking is found, the air conditioner stops, and an error is displayed.	Check code [P12]

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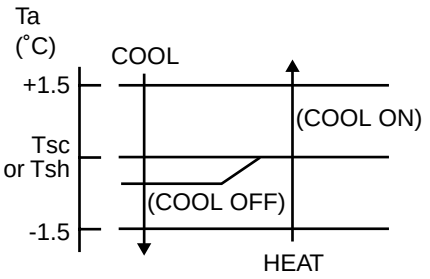
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM561CT-E, RAV-SM801CT-E, RAV-SM1101CT-E, RAV-SM1401CT-E (A03-016)

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>1</td><td>When power supply is reset</td><td>1) Distinction of outdoor units
When the power supply is reset, the outdoors are distinguished, and control is exchanged according to the distinguished result.
2) Setting of speed of the indoor fan/setting weather to adjust air direction or unit.
3) Based on EEPROM data, speed of the indoor fan or setting whether to adjust air direction or not is selected.</td><td>

Air speed/
Air direction adjustment</td></tr>
<tr><td>2</td><td>Operation mode selection</td><td>1) Based on the operation mode selecting command from the remote controller, the operation mode is selected.

<table>
<tr><th>Remote controller command</th><th>Outline of control</th></tr>
<tr><td>STOP</td><td>Air conditioner stops.</td></tr>
<tr><td>FAN</td><td>Fan operation</td></tr>
<tr><td>COOL</td><td>Cooling operation</td></tr>
<tr><td>DRY</td><td>Dry operation</td></tr>
<tr><td>HEAT</td><td>Heating operation</td></tr>
<tr><td>AUTO</td><td>• COOL/HEAT operation mode is automatically selected by Ta and Ts for operation.</td></tr>
</table>


1) Judge the selection of COOL/HEAT mode as shown in the figure above.

When 10 minutes passed after thermostat had been turned off, the heating operation (Thermo OFF) is exchanged to cooling operation if Tsh exceeds +1.5 or more.

(COOL OFF) and (COOL ON) in the figure indicate an example.

When 10 minutes passed after thermostat had been turned off, the cooling operation (Thermo OFF) is exchanged to heating operation if Tsc exceeds –1.5 or less.

2) For the automatic capacity control after judgment of COOL/HEAT, refer to item 4.
3) For the temperature correction of room temperature control in automatic heating operation, refer to item 3.</td><td>

Ta : Room temperature
Ts : Setup temperature
Tsc : Setup temperature in cooling operation
Tsh : Setup temperature + Room temperature control temperature compensation</td></tr>
</table>

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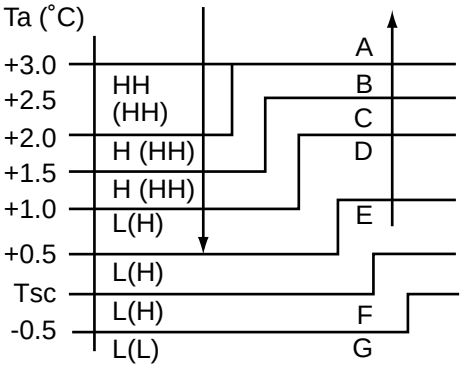
<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>3</td><td>Room temperature control</td><td>1) Adjustment range Remote controller setup temperature (°C)
<table>
<tr><th></th><th>COOL/DRY</th><th>Heating operation</th><th>Auto operation</th></tr>
<tr><td>Wired type</td><td>18 to 29</td><td>18 to 29</td><td>18 to 29</td></tr>
<tr><td>Wireless type</td><td>18 to 30</td><td>16 to 30</td><td>17 to 27</td></tr>
</table>
2) Using the item code 06, the setup temperature in heating operation can be compensated.
<table>
<tr><td>Setup data</td><td>0</td><td>2</td><td>4</td><td>6</td></tr>
<tr><td>Setup temp. compensation</td><td>+0°C</td><td>+2°C</td><td>+4°C</td><td>+6°C</td></tr>
</table>
Setting at shipment
<table>
<tr><td>Setup data</td><td>2</td></tr>
</table></td><td>Shift of suction temperature in heating operation</td></tr>
<tr><td>4</td><td>Automatic capacity control</td><td>1) Based on the difference between Ta and Ts, the operation frequency is instructed to the outdoor unit.</td><td></td></tr>
<tr><td>5</td><td>Air speed selection</td><td>1) Operation with (HH), (H), (L), or [AUTO] mode is performed by the command from the remote controller.
2) When the air speed mode [AUTO] is selected, the air speed varies by the difference between Ta and Ts.
<COOL>
 

• Controlling operation in case when thermo of remote controller works is same as a case when thermo of the body works.
• If the air speed has been changed once, it is not changed for 3 minutes. However when the air volume is exchanged, the air speed changes.
• When cooling operation has started, the air speed selects a downward slope, that is, the high position.
• If the temperature is just on the difference boundary, the air speed does not change.
• Mode in the parentheses indicates one in automatic cooling operation.
<table>
<tr><th rowspan="2"></th><th colspan="2">Standard</th><th colspan="2">Type 1</th><th colspan="2">Type 2</th><th colspan="2">Type 3</th><th colspan="2">Type 7</th><th rowspan="2">SM561</th><th rowspan="2">SM801</th><th rowspan="2">SM1101</th><th rowspan="2">SM1401</th></tr>
<tr><th>COOL</th><th>HEAT</th><th>COOL</th><th>HEAT</th><th>COOL</th><th>HEAT</th><th>COOL</th><th>HEAT</th><th>COOL</th><th>HEAT</th></tr>
<tr><td>F1</td><td></td><td></td><td></td><td></td><td></td><td></td><td>HH</td><td>HH</td><td></td><td></td><td>1120</td><td>1140</td><td>1220</td><td>1300</td></tr>
<tr><td>F2</td><td></td><td></td><td>HH</td><td>HH</td><td></td><td></td><td></td><td></td><td></td><td></td><td>1080</td><td>1080</td><td>1180</td><td>1220</td></tr>
<tr><td>F3</td><td></td><td></td><td></td><td>H+</td><td>HH</td><td>HH</td><td>H+,H</td><td>H+,H</td><td></td><td></td><td>1000</td><td>1040</td><td>1120</td><td>1180</td></tr>
<tr><td>F4</td><td></td><td></td><td>H+</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>970</td><td>990</td><td>1060</td><td>1140</td></tr>
<tr><td>F5</td><td></td><td>HH</td><td></td><td>H</td><td>H+</td><td>H+</td><td></td><td></td><td></td><td></td><td>930</td><td>950</td><td>1020</td><td>1100</td></tr>
<tr><td>F6</td><td>HH</td><td></td><td>H</td><td></td><td></td><td>H</td><td>L+</td><td>L+</td><td></td><td></td><td>910</td><td>940</td><td>980</td><td>1060</td></tr>
<tr><td>F7</td><td>H+</td><td>H+</td><td></td><td></td><td>H</td><td></td><td>L</td><td>L</td><td></td><td>HH</td><td>860</td><td>900</td><td>940</td><td>1020</td></tr>
<tr><td>F8</td><td></td><td>H</td><td></td><td>L+</td><td></td><td>L+</td><td></td><td></td><td>HH</td><td>H+,H</td><td>820</td><td>880</td><td>910</td><td>970</td></tr>
<tr><td>F9</td><td>H</td><td></td><td>L+</td><td>L</td><td>L+</td><td>L</td><td></td><td></td><td>H+,H</td><td></td><td>800</td><td>860</td><td>880</td><td>940</td></tr>
<tr><td>FA</td><td></td><td>L+</td><td>L</td><td></td><td>L</td><td></td><td></td><td></td><td></td><td>L+</td><td>780</td><td>830</td><td>850</td><td>930</td></tr>
<tr><td>FB</td><td>L+</td><td>L</td><td></td><td></td><td></td><td></td><td></td><td></td><td>L+</td><td>L</td><td>760</td><td>800</td><td>820</td><td>880</td></tr>
<tr><td>FC</td><td>L</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>L</td><td></td><td>740</td><td>780</td><td>790</td><td>850</td></tr>
<tr><td>FD</td><td>LL</td><td>LL</td><td>LL</td><td>LL</td><td>LL</td><td>LL</td><td>LL</td><td>LL</td><td>LL</td><td>LL</td><td>550</td><td>550</td><td>580</td><td>580</td></tr>
</table></td><td>HH > H > L > LL</td></tr>
</table>

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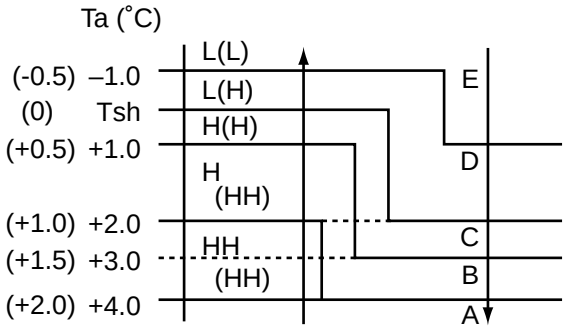
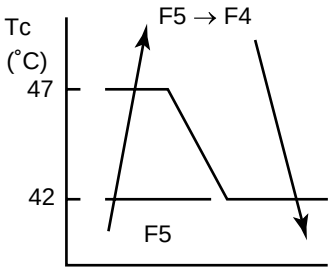
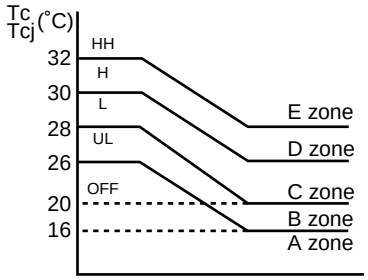
No.	Item	Outline of specifications	Remarks
5	Air speed selection (Continued)	**<HEAT>**  Value in the parentheses indicates one when thermostat of the remote controller works. Value without parentheses indicates one when thermostat of the body works. • If the air speed has been changed once, it is not changed for 1 minute. However when the air speed is exchanged, the air speed changes. • When heating operation has started, the air speed selects a upward slope, that is, the high position. • If the temperature is just on the difference boundary, the air speed does not change. • Mode in the parentheses indicates one in automatic heating operation. • In Tc ≥ 60°C, the air speed increases by 1 step. 3) In heating operation, the mode changes to [UL] if thermostat is turned off. 4) If Ta ≥ 25°C when heating operation has started and when defrost operation has been cleared, it operates with HIGH (H) mode or (HH) for 1 minute from when Tc has entered in E zone of cool air discharge preventive control (Item 6). 5) In automatic cooling/heating operation, the revolution frequency of [HH] is set larger than that in the standard cooling/heating operation. However the revolution frequency is restricted in the automatic heating operation as shown in the following figure.	[PRE-HEAT] display 
6	Cool air discharge preventive control	1) In heating operation, the indoor fan is controlled based on the detected temperature of Tc sensor or Tcj sensor. As shown below, the upper limit of the revolution frequency is determined.  	In D or E zone, the priority is given to setup of air volume exchange. In A and B zones, [PRE-HEAT] is displayed.

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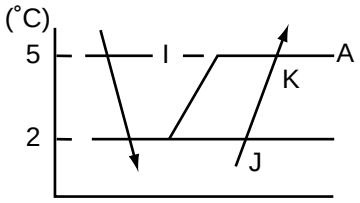
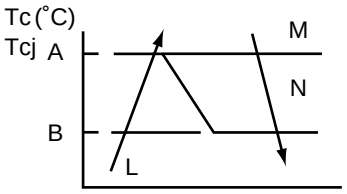
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>7</td><td>Freeze preventive control (Low temperature release)</td><td>1) The cooling operation (including Dry operation) is performed as follows based on the detected temperature of Tc sensor or Tcj sensor.
When [J] zone is detected for 6 minutes (Following figure), the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [J] zone.
In [K] zone, time counting is interrupted and the operation is held.
When [I] zone is detected, the timer is cleared and the operation returns to the normal operation.
If the commanded frequency becomes S0 because the operation continues in [J] zone, the return temperature A is raised from 5°C to 12°C until [I] zone is detected and the indoor fan operates with [M] mode.
 

In heating operation, the freeze-preventive control works if 4-way valve is not exchanged and the condition is satisfied. (However the temperature for J zone dashing control is changed from 2°C to –5°C.)</td><td>Tcj : Indoor heat exchanger sensor temperature

[M] mode :
Air speed selection</td></tr>
<tr><td>8</td><td>High-temp release control</td><td>1) The heating operation is performed as follows based on the detected temperature of Tc sensor or Tcj sensor.
• When [M] zone is detected, the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [M] zone.
• In [N] zone, the commanded frequency is held.
• When [L] zone is detected, the commanded frequency is returned to the original value by approx. 6Hz every 60 seconds.
Setup at shipment
<table><tr><th colspan="2">Control temp (°C)</th></tr><tr><td>A</td><td>B</td></tr><tr><td>56 (54)</td><td>52 (52)</td></tr></table> 

NOTE :
When the operation has started or when Tc or Tcj became lower than 30°C after start of the operation, temperature is controlled between values in parentheses of A and B.</td><td>Same when thermostat is turned off.</td></tr>
<tr><td>9</td><td>Drain pump control

When, the drain up kit (sold separately) is mounted.</td><td>1) In cooling operation (including Dry operation), the drain pump is usually operated.
2) If the float switch operates while drain pump operates, the compressor stops, the drain pump continues the operation, and a check code is output.
3) If the float switch operates while drain pump stops, the compressor stops and the drain pump operates. If the float switch keeps operating for approx. 4 minutes, a check code is output.</td><td>Check code [P10]</td></tr>
</table>

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Item	Outline of specifications	Remarks
10	DAfter-heat elimination	When heating operation stops, the indoor fan operates with LOW mode for approx. 30 seconds.	
11	Frequency fixed operation (Test run)	**<In case of wired remote controller>** 1. When pushing [CHECK] button for 4 seconds or more, [TEST] is displayed on the display screen and the mode enters in Test run mode. 2. Push [ON/OFF] button. 3. Using [MODE] button, change the mode from [COOL] to [HEAT]. • Do not use other mode than [COOL]/[HEAT] mode. • During test run operation, the temperature cannot be adjusted. • An error is detected as usual. • A frequency fixed operation is performed. 4. After the test run, push [ON/OFF] button to stop the operation. (Display in the display part is same as the procedure in item 1).) 5. Push [CHECK] button to clear the test run mode. ([TEST] display in the display part disappears and the status returns to the normal stop status.) **<In case of wireless remote controller>** 1. Turn off the power of the set. Remove the adjuster with sensors from the ceiling panel. 2. Turn Bit [1: TEST] of sensor P.C. board switch [S003] from OFF to ON. Turn on the power of the set. 3. Push [ON/OFF] button of the wireless remote controller and set the operation mode to [COOL] or [HEAT] using [MODE] button. (During test run operation, all the display lamps of wireless remote controller sensors flash.) • Do not use other mode than [COOL]/[HEAT] mode. • An error is detected as usual. • A frequency fixed operation is performed. 4. After the test run, push [ON/OFF] button to stop the operation. 5. Turn off the power of the set. Turn Bit [1: TEST] of sensor P.C. board switch [S003] from ON to OFF. Mount the adjuster with sensors to the ceiling panel.	
12	Central control mode selection	1) Setting at the central controller side enables to select the contents which can be operated on the remote controller at indoor unit side. 2) **RBC-AMT21** **[Last push priority] :** The operation contents can be selected from both remote controller and central controller of the indoor unit side, and the operation is performed with the contents selected at the last. **[Center] :** Start/Stop operation only can be handled on the remote controller at indoor unit side. **[Operation Prohibited] :** It cannot be operated on the remote controller at indoor unit side. (Stop status is held.)	(No display) [CENTER] goes on. [CENTER] goes on. In a case of wireless type, the display lamp does not change. However, contents which can be operated are same. The status set in [CENTER]/[Operation Prohibited] mode is notified with the receiving sound “Pi, Pi, Pi, Pi, Pi” (5 times).

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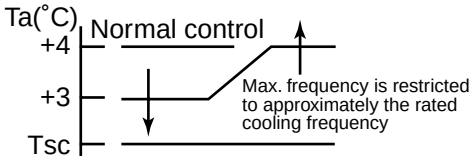
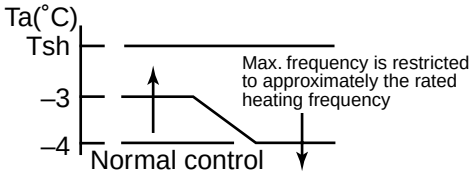
No.	Item	Outline of specifications	Remarks
13	Energy-save control (By connected outdoor unit)	1) Selecting [AUTO] mode enables an energy-saving to be operated. 2) The setup temperature is shifted (corrected) in the range not to lose the comfort ability according to input values of various sensors. 3) Data (Input value room temp. Ta, Outside temp. To, Air volume, Indoor heat exchanger sensor temp. Tc) for 20 minutes are taken the average to calculate correction value of the setup temperature. 4) The setup temperature is shifted every 20 minutes, and the shifted range is as follows. In cooling time : +1.5 to –1.0k In heating time : –1.5 to +1.0k	
14	Max. frequency cut control	1) This control is operated by selecting [AUTO] operation mode. 2) COOL operation mode: the frequency is controlled according to the following figure if To < 28°C.  3) HEAT operation mode: the frequency is controlled according to the right figure if To > 15°C. 	
15	DC motor	1) When the fan operation has started, positioning of the stator and the rotor are performed. (Moves slightly with tap sound) 2) The motor operates according to the command from the indoor controller. **NOTES :** • When the fan rotates while the air conditioner stops due to entering of outside air, etc, the air conditioner may operated while the fan motor stops. • When a fan locking is found, the air conditioner stops, and an error is displayed.	Check code [P12]

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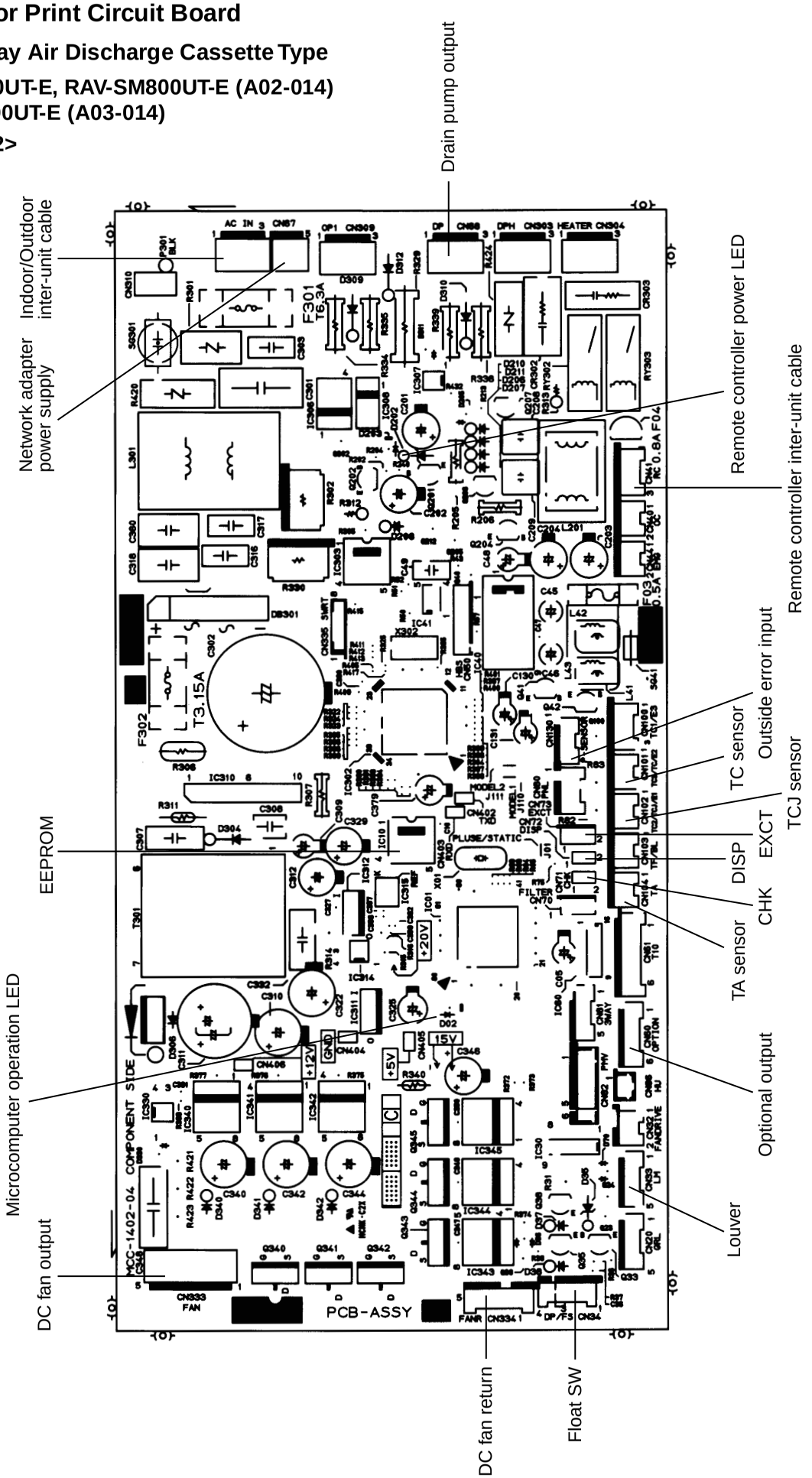
8-3. Indoor Print Circuit Board

8-3-1. 4-Way Air Discharge Cassette Type

RAV-SM560UT-E, RAV-SM800UT-E (A02-014)
RAV-SP1100UT-E (A03-014)
<MCC-1402>



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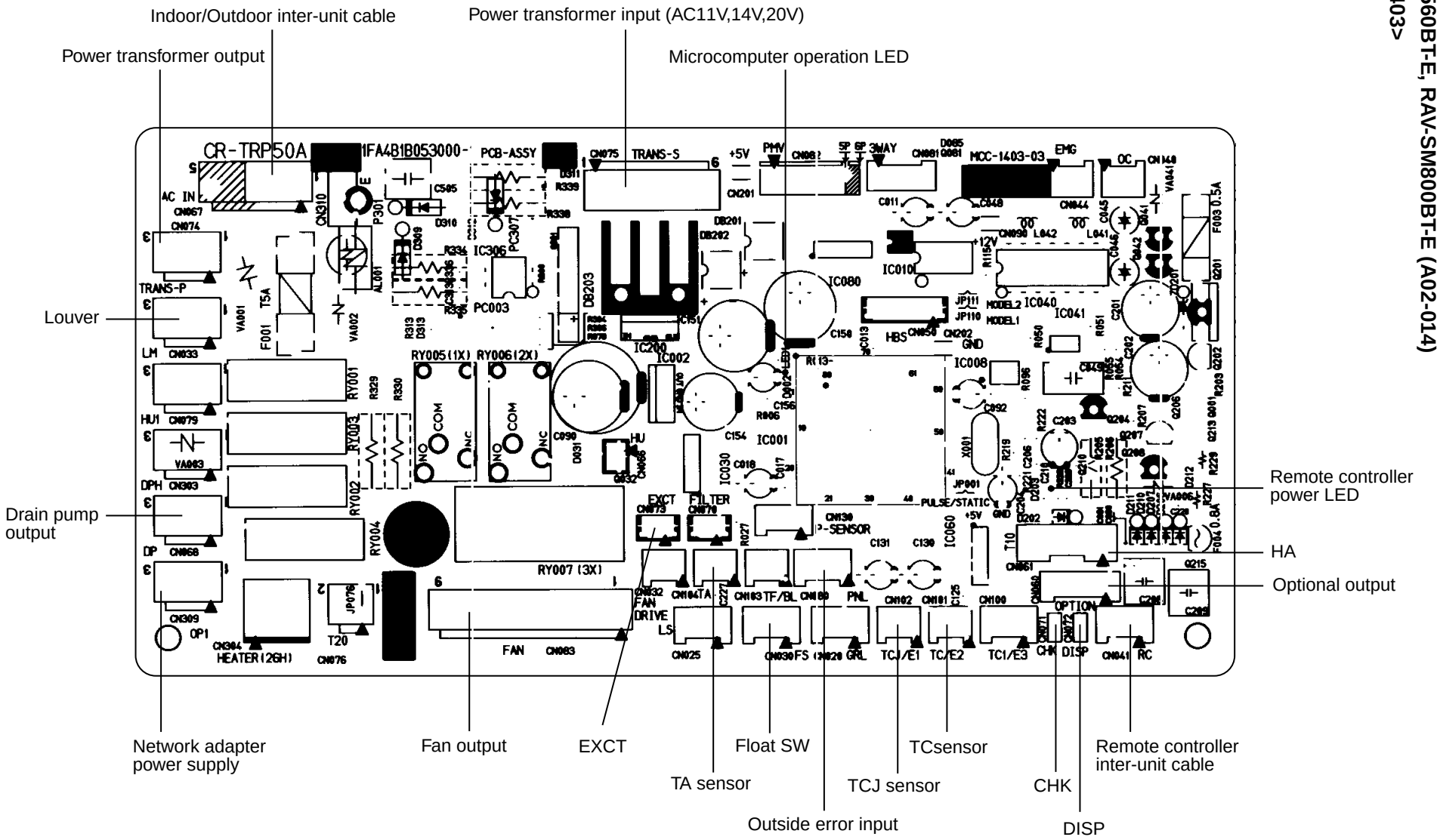

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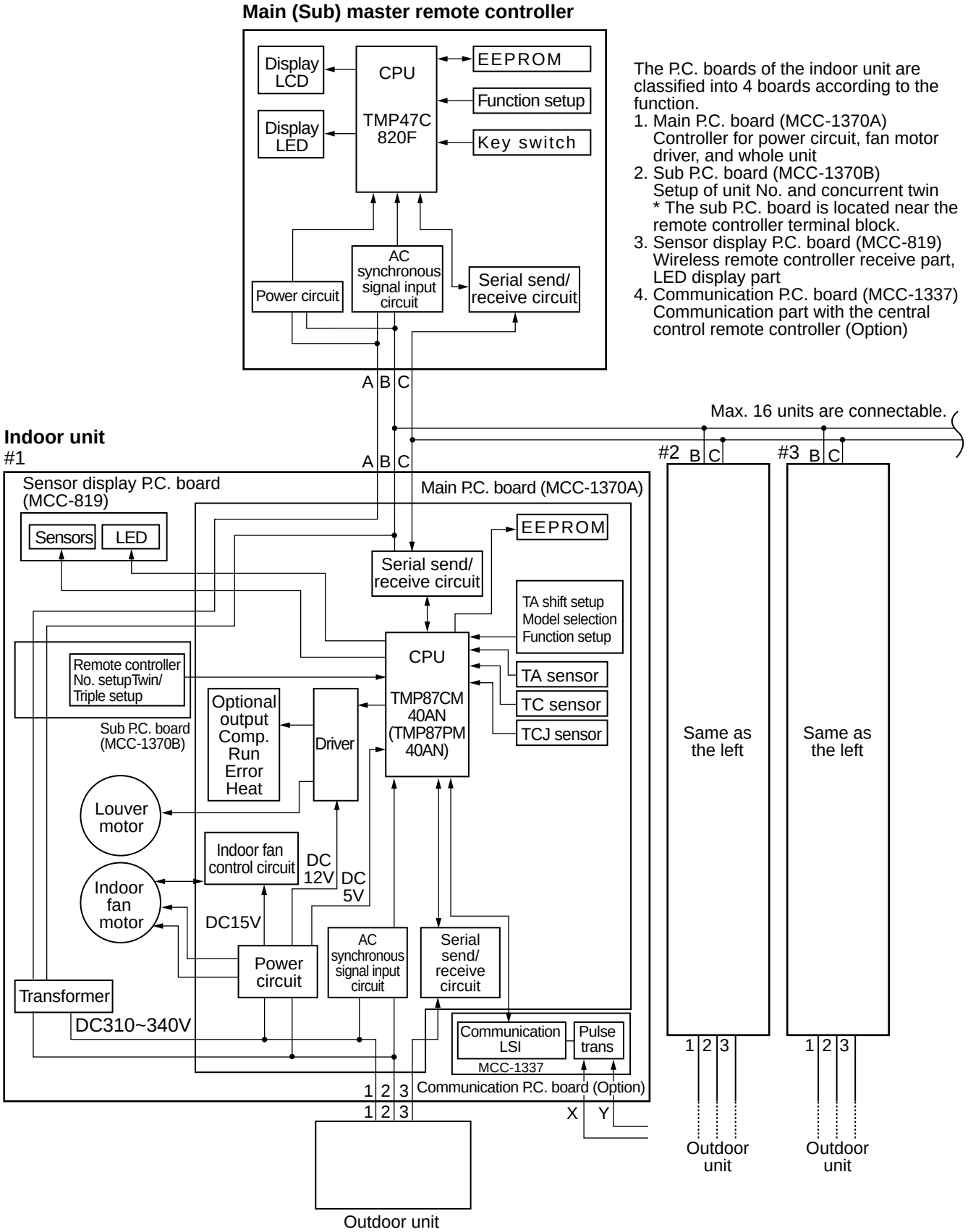
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu Kylmäpoint Oy

9. CIRCUIT CONFIGURATION AND CONTROL SPECIFICATIONS

9-1. Microcomputer System Block Diagram

RAV-SM560AT-E, RAV-SM560UT-E, RAV-SM560BT-E,
RAV-SM800AT-E, RAV-SM800UT-E, RAV-SM800BT-E (A02-014)

9-1-1. Connection of Main Remote Controller



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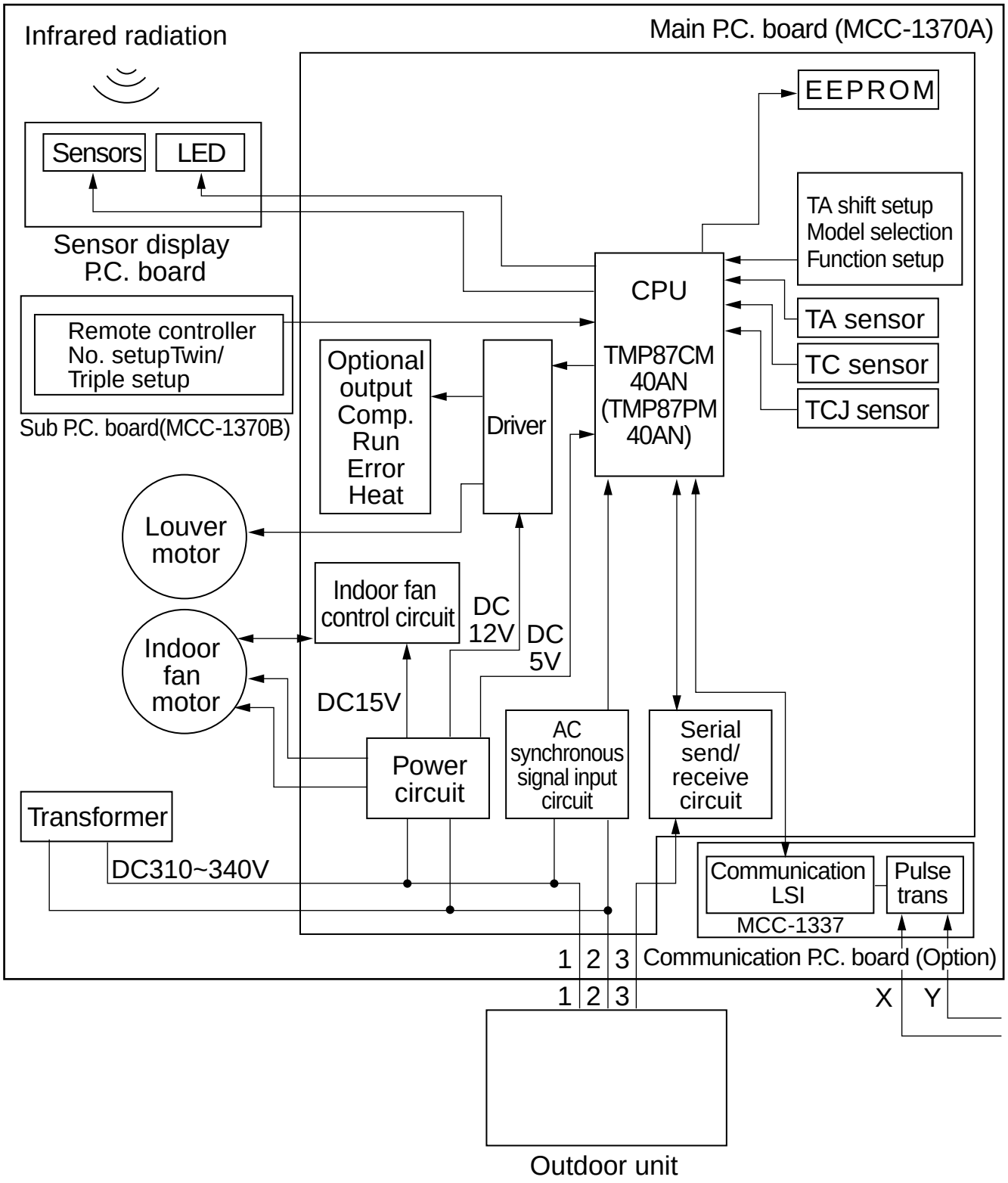
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

9-1-2. Connection of Wireless Remote Controller

Indoor unit

#1



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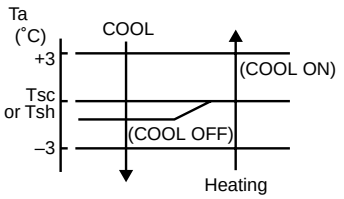
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

9-1-3. Control Specifications

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>1</td><td>When power supply is reset</td><td>1) Distinction of outdoor units
When the power supply is reset, the outdoors are distinguished, and control is exchanged according to the distinguished result.
2) Setting of the indoor fan speed
Based on EEPROM data, rspeed of the indoor fan is selected.</td><td>Air speed</td></tr>
<tr><td>2</td><td>Operation mode selection</td><td>1) Based on the operation mode selecting command from the remote controller, the operation mode is selected.
<table><tr><th>Remote controller command</th><th>Outline of control</th></tr><tr><td>STOP</td><td>Air conditioner stops.</td></tr><tr><td>FAN</td><td>Fan operation</td></tr><tr><td>COOL</td><td>Cooling operation</td></tr><tr><td>DRY</td><td>Dry operation</td></tr><tr><td>HEAT</td><td>Heating operation</td></tr><tr><td>AUTO</td><td> 
</td></tr></table>
1) Judge the selection of COOL/HEAT mode as shown in the figure below.
When the heating operation (Thermo OFF) is exchanged to cooling operation if Tsh exceeds +3 or more.
(COOL OFF) and (COOL ON) in the figure indicate an example.
When the cooling operation (Thermo OFF) is exchanged to heating operation if Tsc exceeds -3 or less.
2) For the automatic capacity control after judgment of COOL/HEAT, refer to item 4.
3) For the temperature correction of room temperature control in automatic heating operation, refer to item 3.</td><td>Ta : Room temperature
Ts : Setup temperature
Tsc : Setup temperature in cooling operation
Tsh : Setup temperature in heating operation</td></tr>
<tr><td>3</td><td>Room temperature control</td><td>1) Adjustment range Remote controller setup temperature (°C)
<table><tr><th></th><th>COOL/ DRY</th><th>Heating operation</th><th>Auto operation</th></tr><tr><td>Standard type</td><td>18 to 29</td><td>18 to 29</td><td>18 to 29</td></tr><tr><td>Wireless type</td><td>17 to 30</td><td>17 to 30</td><td>19 to 29</td></tr></table>
<table><tr><td>Remote controller setup temp</td><td>▼5</td><td>▼4</td><td>▼3</td><td>▼2</td><td>▼1</td><td>Standard</td><td>▲1</td><td>▲2</td><td>▲3</td><td>▲4</td><td>▲5</td></tr><tr><td>Setup temp (°C)</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td></tr></table>
2) Differential 1K (=deg)
3) In heating operation, the setup temperature can be corrected by using Dip switch (SW03) on the indoor P.C. board.
<table><tr><td rowspan="2">SW03</td><td>1</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td></tr><tr><td>2</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td></tr><tr><td colspan="2">Setup temp correction</td><td>+0°C</td><td>+2°C</td><td>+4°C</td><td>+6°C</td></tr></table>
Setup at shipment
<table><tr><td colspan="2">SW03</td></tr><tr><td>1</td><td>2</td></tr><tr><td>ON</td><td>OFF</td></tr></table></td><td>Max. setup temperature
Ts (Max) = 35°C</td></tr>
</table>

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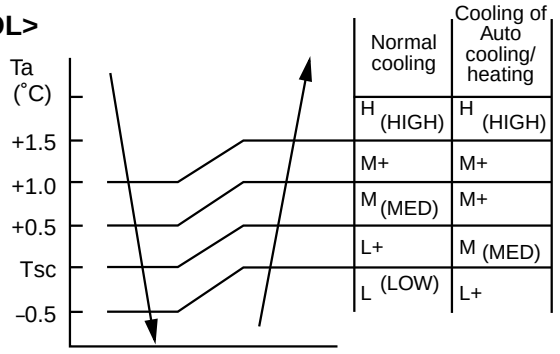
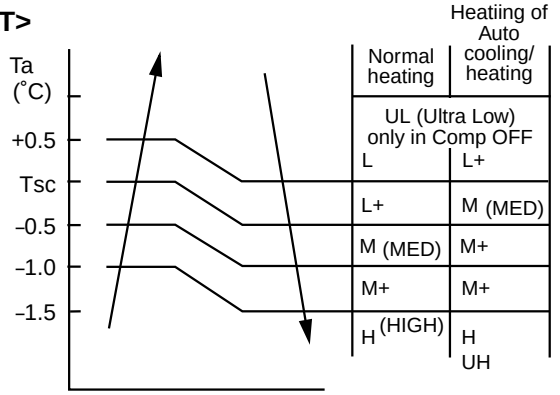
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>4</td><td>Automatic capacity control

(GA control)</td><td>1) Based on the difference between Ta and Ts, the operation frequency is instructed to the outdoor unit.

NOTE :
In cooling operation :
When calculating the following conditions for 29 minutes, the commanded frequency is assumed as the rated cooling frequency.<table><tr><td>1</td><td>Ta < 28°C</td></tr><tr><td>2</td><td>Indoor fan [High]</td></tr><tr><td>3</td><td>32°C < To ≤ 38°C or no To</td></tr><tr><td>4</td><td>Operation exceeding the rated cooling frequency</td></tr></table>In heating operation: When calculating the following conditions for 29 minutes, the commanded frequency is assumed as the rated heating frequency.<table><tr><td>1</td><td>Ta ≥ 19°C</td></tr><tr><td>2</td><td>Indoor fan [High]</td></tr><tr><td>3</td><td>5°C < To ≤ 10°C or no To</td></tr><tr><td>4</td><td>Operation exceeding the rated heating frequency</td></tr><tr><td>5</td><td>Tc ≥ 38°C</td></tr></table>NOTE :
When air volume is set to [L], the maximum frequency is restricted.</td><td>Tc : Temperature of indoor heat exchanger sensor</td></tr>
<tr><td>5</td><td>Air volume control</td><td>1) Operation with [HIGH (H)], [MED (M)], [LOW (L)], or [AUTO] mode is performed by the command from the remote controller.
2) When the air volume mode [AUTO] is selected, the air volume varies by the difference between Ta and Ts.

<COOL>
 

<HEAT>
 
</td><td>UH > H > M+ > M > L + > L > UL</td></tr>
</table>

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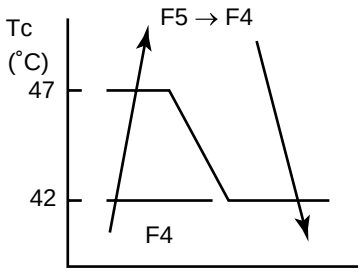
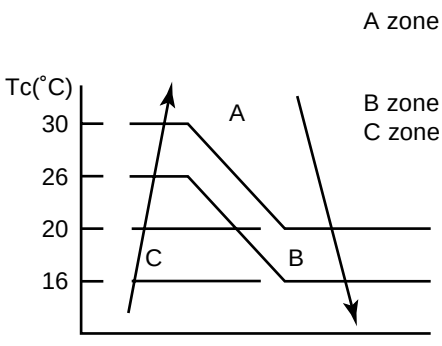
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>5</td><td>Air volume control (Continued)</td><td>
<table>
<tr><th rowspan="2">Tap</th><th colspan="2">Air volume setup</th><th>SM560</th><th>SM800</th></tr>
<tr><th>COOL, DRY, FAN</th><th>HEAT</th><th colspan="2">Revolutions per minute (rpm)</th></tr>
<tr><td>F4</td><td></td><td>UH</td><td>1290</td><td>1480</td></tr>
<tr><td>F5</td><td></td><td>H</td><td>1230</td><td>1480</td></tr>
<tr><td>F6</td><td>H</td><td></td><td>1180</td><td>1340</td></tr>
<tr><td>F7</td><td>M+</td><td>M+</td><td>1150</td><td>1320</td></tr>
<tr><td>F8</td><td></td><td>M</td><td>1120</td><td>1310</td></tr>
<tr><td>F9</td><td>M</td><td></td><td>1060</td><td>1200</td></tr>
<tr><td>FA</td><td></td><td>L+</td><td>1060</td><td>1200</td></tr>
<tr><td>FB</td><td>L+</td><td>L</td><td>990</td><td>1100</td></tr>
<tr><td>FC</td><td>L</td><td></td><td>940</td><td>1040</td></tr>
<tr><td>FD</td><td></td><td>UL</td><td>900</td><td>900</td></tr>
</table>
3) In heating operation, the mode changes to [Ultra Low (UL)] or [STOP] if thermostat is turned off.
4) If Ta ≥ 25°C when heating operation has started and when defrost operation has been cleared, it operates with MED mode or higher mode for 1 minute from when Tc has entered in A zone of cool air discharge preventive control (Item 6).
5) In automatic cooling/heating operation, the revolution frequency of [HIGH (H)] is set larger than that in the standard cooling/heating operation. However the revolution frequency is restricted in the automatic heating operation as shown in the following figure.


6) (For wireless type only) The mode enters [AUTO] in automatic cooling/heating operation.
7) The mode enters [LOW (L)] during Dry operation</td><td>“Stop” is a “cool air discharge preventive control” operation by Tc.
Tc: Indoor heat exchanger sensor temp.

Display: [AUTO]</td></tr>
<tr><td>6</td><td>Cool air discharge preventive control</td><td>1) In heating operation, the indoor fan is controlled based on the detected temperature of Tc sensor. As shown below, the upper limit of the revolution frequency is determined.

</td><td>Display in C zone

Display of main unit: Defrost LED goes on.

When wired remote controller is installed: PRE-HEAT/DEFROST goes on remote controller.</td></tr>
</table>

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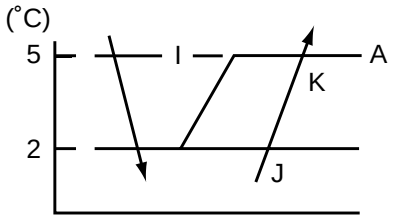
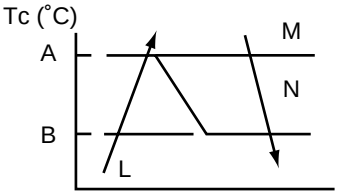
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>7</td><td>Freeze preventive control
(Low temperature release)</td><td>1) The cooling operation (including Dry operation) is performed as follows based on the detected temperature of Tc sensor or Tcj sensor.
When [J] zone is detected for T1 minutes (Following figure), the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [J] zone.
<table><tr><th></th><th>T1</th></tr><tr><td>Normal</td><td>6 minutes</td></tr><tr><td>Twin</td><td>6 minutes</td></tr></table>
In [K] zone, time counting is interrupted and the operation is held.
When [I] zone is detected, the timer is cleared and the operation returns to the normal operation.
If the commanded frequency becomes S0 because the operation continues in [J] zone, the return temperature A is raised from 5°C to 12°C until [I] zone is detected and the indoor fan operates with [L] mode.
 

In heating operation, the freeze-preventive control works if 4-way valve is not exchanged and the condition is satisfied.</td><td>Tcj : Indoor heat exchanger sensor temperature</td></tr>
<tr><td>8</td><td>High-temp release control</td><td>1) The heating operation is performed as follows based on the detected temperature of Tc sensor.
• When [M] zone is detected, the commanded frequency is decreased from the real operation frequency. After then the commanded frequency changes every 30 seconds while operation is performed in [M] zone.
• In [N] zone, the commanded frequency is held.
• When [L] zone is detected, the commanded frequency is returned to the original value by approx. 6Hz every 60 seconds.
Setup at shipment
<table><tr><th colspan="2">Control temp (°C)</th></tr><tr><td>A</td><td>B</td></tr><tr><td>56 (54)</td><td>52 (52)</td></tr></table>
 

NOTE :
When the operation has started or when Tc became lower than 30°C after start of the operation, temperature is controlled between values in parentheses of A and B.</td><td>Same when thermostat is turned off.</td></tr>
</table>

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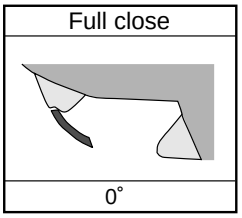
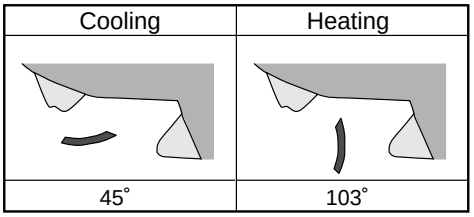
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Item	Outline of specifications	Remarks
9	Louver control 1) Louver position	The louver angle is displayed setting 0° as “Full close”.  1) In the initial operation after power-ON, the position is automatically controlled according to the operating status (COOL/HEAT).  2) After then a louver position is stored in the microcomputer every time when position is operated on the remote controller, and the louver operates at the position stored in memory in the next operation and after. * If the operation mode has been changed from COOL to HEAT, from HEAT to COOL, or the power has turned off, the stored louver position is cleared and the status returns to one in item 1).	
	2) Air direction adjustment (Swing operation)	1) When pushing [LOUVER] button during operation, the louver starts swinging. 2) When the louver has arrived at the desired position, push [LOUVER] again. The louver stops at that position.	
10	Frequency fixed operation (Test run)	1) In case of wired remote controller 1. When pushing [ON/OFF] button on the remote controller continuously for 5 seconds, the mode enters [TEST]. The indoor fan rotates with [HIGH] and a frequency fixed operation starts. 2. During this operation, the buttons other than [ON/OFF], [UP △] and [DOWN ▽] cannot be accepted. However, items 7 and 8 are effective. 3. To stop the frequency fixed operation, use [ON/OFF] button only. 2) In case of wireless remote controller (Without wired remote controller) 1. When pushing [Temporary] button continuously for 10 seconds or more, “Pi” sound is heard and the mode enters [TEST]. The indoor fan rotates with [HIGH] and a frequency fixed operation of [COOL] starts. **NOTES :** • Temporary button is provided to near the display part of the main unit when opening the front panel. • If [Temporary] button is not continuously pushed for 10 seconds, “Automatic heating/cooling operation” is performed. 2. To stop the operation, push [Temporary] button again. **NOTE :** Operation on the wireless remote controller is not accepted.	[COOL]/[HEAT] flash. Air volume: [AUTO] Temperature COOL: [L] HEAT: [H] Commanded frequency Approximately [S7]

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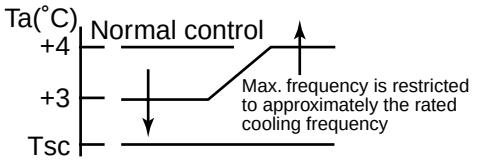
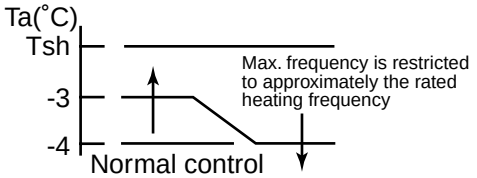
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

<table>
<tr><th>No.</th><th>Item</th><th>Outline of specifications</th><th>Remarks</th></tr>
<tr><td>11</td><td>Filter sign display</td><td>1) The operation time of the indoor fan is calculated, the filter lamp (Orange) on the display part of the main unit goes on when the specified time (240H) has passed. When a wired remote controller is connected, the filter reset signal is sent to the remote controller, and also it is displayed on LCD of the wired remote controller.
2) When the filter reset signal has been received from the wired remote controller after [FILTER] lamp has gone on or when the filter check button (Temporary button) is pushed, time of the calculation timer is cleared. In this case, the measurement time is reset if the specified time has passed, and display on LCD and the display on the main unit disappear.</td><td>[FILTER] goes on.</td></tr>
<tr><td>12</td><td>Central control mode selection</td><td colspan="2">1) Setting at the central remote controller side enables to select the contents which can be operated on the remote controller at indoor unit side.
2) Operation contents on the remote controller at indoor unit side
[Last push priority] :
The operation contents can be selected from both remote controller and the central controller of the indoor unit side, and the operation is performed with the contents selected at the last.
[Center] :
Start/Stop operation only can be handled on the remote controller at indoor unit side.
[Operation Prohibited] :
It cannot be operated on the remote controller at indoor unit side.
(Stop status is held.)
3) Display on the display part of the main unit or wired remote controller
<table>
<tr><td>Setup on central control remote controller
Last push priority</td><td>Display on wired remote controller
(In case of RBC-AM1)
[Central control] goes off.</td><td>Display on wired remote controller
(In case of RBC-AM1)
[Center] goes off.</td><td>Display on main unit
(Only in case of no wired remote controller)
No display</td></tr>
<tr><td>Center</td><td>[Central control] goes on.</td><td>[Center] goes on.</td><td>[DEFROST] lamp (Orange) 1Hz flashes.</td></tr>
<tr><td>Operation prohibited</td><td>[Central control] flashes.</td><td>[Center] flashes.</td><td>[DEFROST] lamp (Orange) 5Hz flashes.</td></tr>
</table>
NOTE : When a wired remote controller is connected, there is no display on the main unit.</td></tr>
<tr><td>13</td><td>Energy-save control
(By connected outdoor unit)</td><td colspan="2">1) Selecting [AUTO] mode enables an energy-saving to be operated.
2) The setup temperature is shifted (corrected) in the range not to lose the comfort ability according to input values of various sensors.
3) Data (Input value room temp. Ta, Outside temp. To, Air volume, Indoor heat exchanger sensor temp. Tc) for 20 minutes are taken the average to calculate correction value of the setup temperature.
4) The setup temperature is shifted every 20 minutes, and the shifted range is as follows. In cooling time : +1.5 to –1.0K
In heating time : –1.5 to +1.0K</td></tr>
<tr><td>14</td><td>Max. frequency cut control</td><td colspan="2">1) This control is operated by selecting [AUTO] operation mode.
2) COOL operation mode: the frequency is controlled according to the following figure if To < 28°C.
 

3) HEAT operation mode: the frequency is controlled according to the right figure if To > 15°C.
 
</td></tr>
</table>

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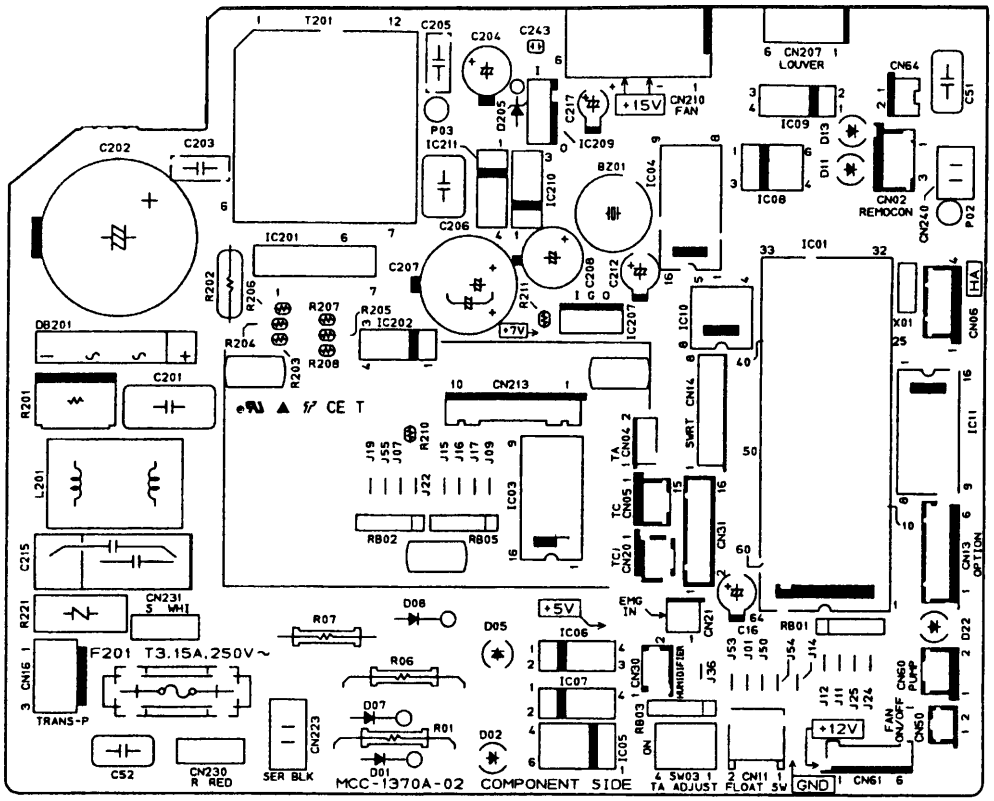
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

9-2. Indoor Control Circuit

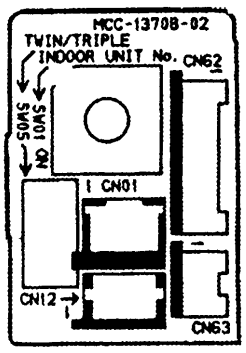
RAV-SM560UT-E, RAV-SM560BT-E,
RAV-SM800UT-E, RAV-SM800BT-E (A02-014)

9-2-1. Print Circuit Board

<Main P.C. board (MCC-1370A)>



<Sub P.C. board (MCC-1370B)>



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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

9-2-2. Outline of Main Controls

1. Pulse Modulating Valve (PMV) control

1) For PMV, SM560 is controlled with 45 to 500 pulses and SM800 with 50 to 500 pulses during operation, respectively.
2) In cooling operation, PMV is controlled with the temperature difference between TS sensor and TC sensor.
3) In heating operation, PMV is controlled with the temperature difference between TS sensor and TE sensor.
4) For the temperature difference in items 2) and 3), 1 to 5K is aimed as the target in both cooling and heating operations.
5) When the cycle excessively rose in both cooling and heating operations, PMV is controlled by TD sensor. The aimed value is usually 105°C for SM560 and 100°C for SM800 in both cooling and heating operations.

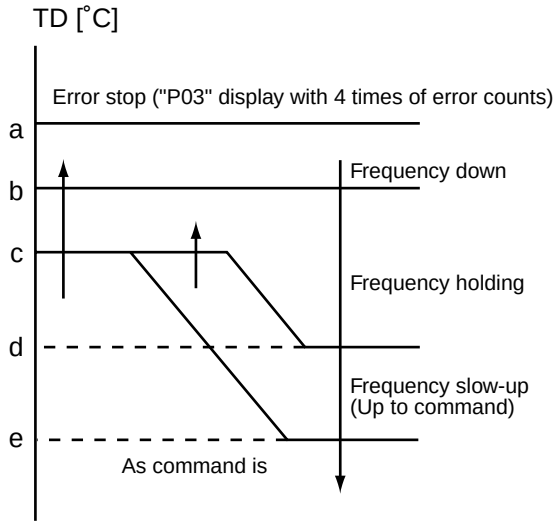
REQUIREMENT

A sensor trouble may cause a liquid back-flow or abnormal overheat resulting in excessive shortening of the compressor life. In a case of trouble on the compressor, be sure to check there is no error in the resistance value an the refrigerating cycle of each sensor after repair and then start the operation.

2. Discharge temperature release control

1) This function controls the operation frequency, that is, lowers the operation frequency when the discharge temperature has not lower or the discharge temperature has rapidly risen during PMV control. It subdivides the frequency control up to a unit of 0.6Hz to stabilize the cycle.
2) When the discharge temperature is detected in an abnormal stop zone, the unit stops the compressor and restarts after 2 minutes 30 seconds. The error counter is cleared when it has continued the operation for 10 minutes. If the abnormal stop zone has been detected by 4 times without clearing of counter, an error 'P03' is displayed.

* The cause is considered as excessively little amount of refrigerant, defective PMV, or clogging of cycle.

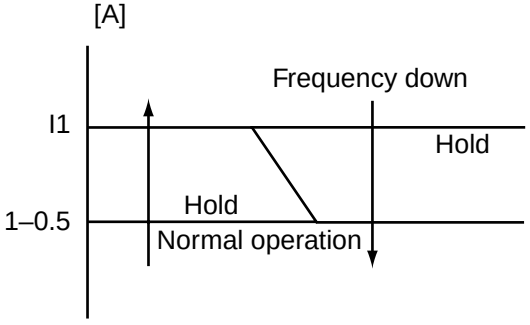


[°C]

	a	b	c	d	e
SM560	117	112	108	105	98
SM800	111	106	100	95	90

3. Current release control

The output frequency and the output voltage are controlled by AC current value detected by T02 on the outdoor P.C. board so that input current of the inverter does not exceed the specified value.



Objective model	SM560		SM800	
	COOL	HEAT	COOL	HEAT
I1 value [A]	10.22	10.35	13.00	14.43

* For the cooling only models, only COOL is objective.

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

9-2-3. Indoor P.C. Board Optional Connector Specifications

Function	Connector No.	Pin No.	Specifications	Remarks
Option output	CN60	1	DC12V (COM)	
		2	Defrost output	ON during defrost operation of outdoor unit
		3	Thermo. ON output	ON during Real thermo-ON (Comp ON)
		4	Cooling output	ON when operation mode is in cooling system (COOL, DRY, COOL in AUTO cooling/heating)
		5	Heating output	ON when operation mode is in heating system (HEAT, HEAT in AUTO cooling/heating)
		6	Fan output	ON during indoor fan ON (Air purifier is used/Interlock cable)
Outside error input	CN80	1	DC12V (COM)	(When continued for 1 minute) Check code “L30” is output and forced operation stops.
		2	DC12V (COM)	
		3	Outside error input	
Filter option error	CN70	1	Filter/Option/Humidifier setup input	Option error input is controlled. (Protective operation for device attached to outside is displayed.)
		2	0V	* Setting of option error input is performed from remote controller. (DN=2A)
CHK Operation check	CN71	1	Check mode input	Used for operation check of indoor unit. (Communication with outdoor unit or remote controller is not performed, but the specified operation such as indoor fan “H” or drain pump ON is output.)
		2	0V	
DISP display mode	CN72	1	Display mode input	Display mode enables indoor unit and remote controller to communicate. (When power is turned on)
		2	0V	
EXCT demand	CN73	1	Demand input	Forced thermo-OFF operation in indoor unit
		2	0V	

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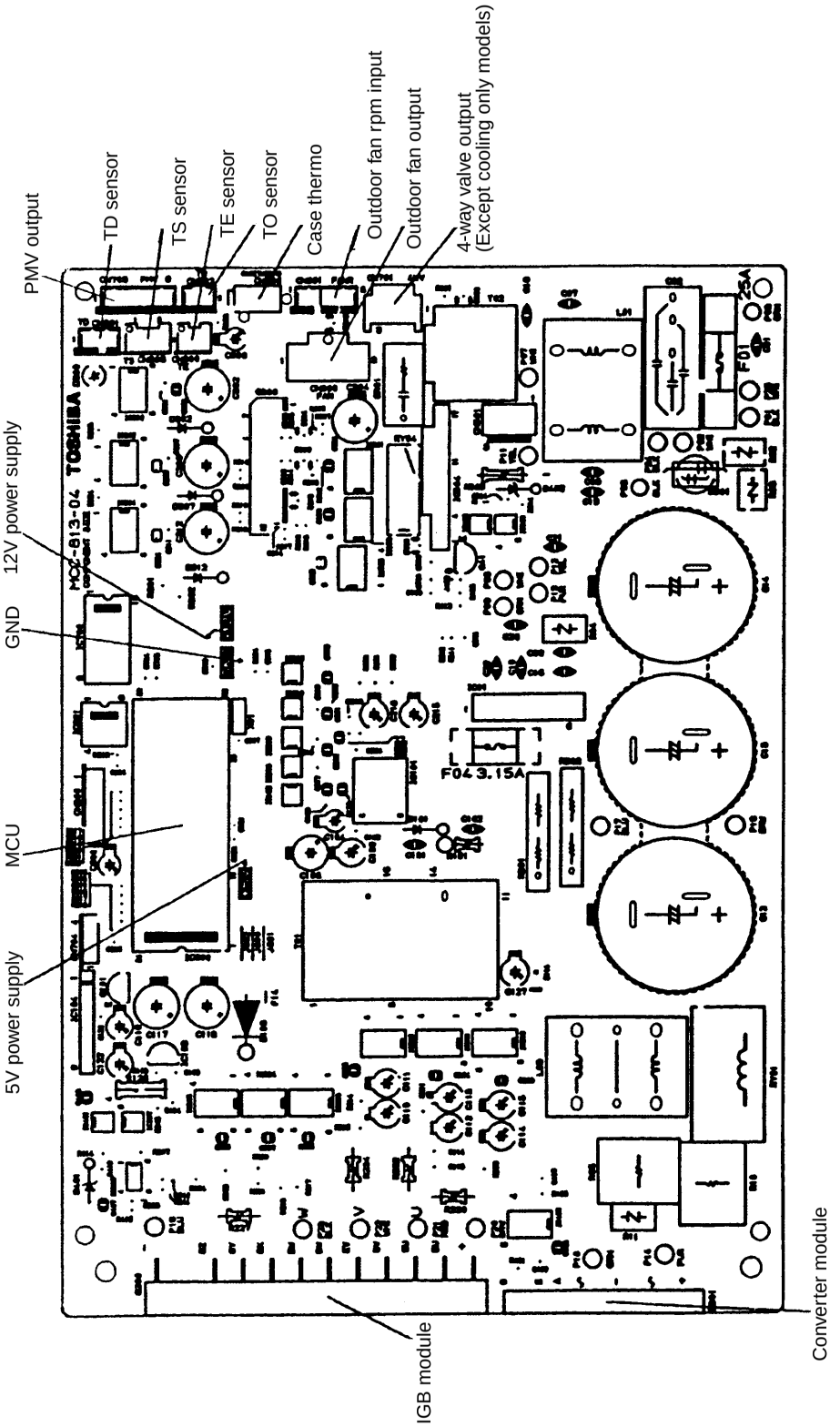
9-3. Outdoor Controls

9-3-1. Print Circuit Board

<Viewed from parts of P.C board>

RAV-SM560AT-E, RAV-SM800AT-E, RAV-SM1100AT-E, RAV-SM1400AT-E (A02-014, A03-003, A03-007)

<MCC-1398>



Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

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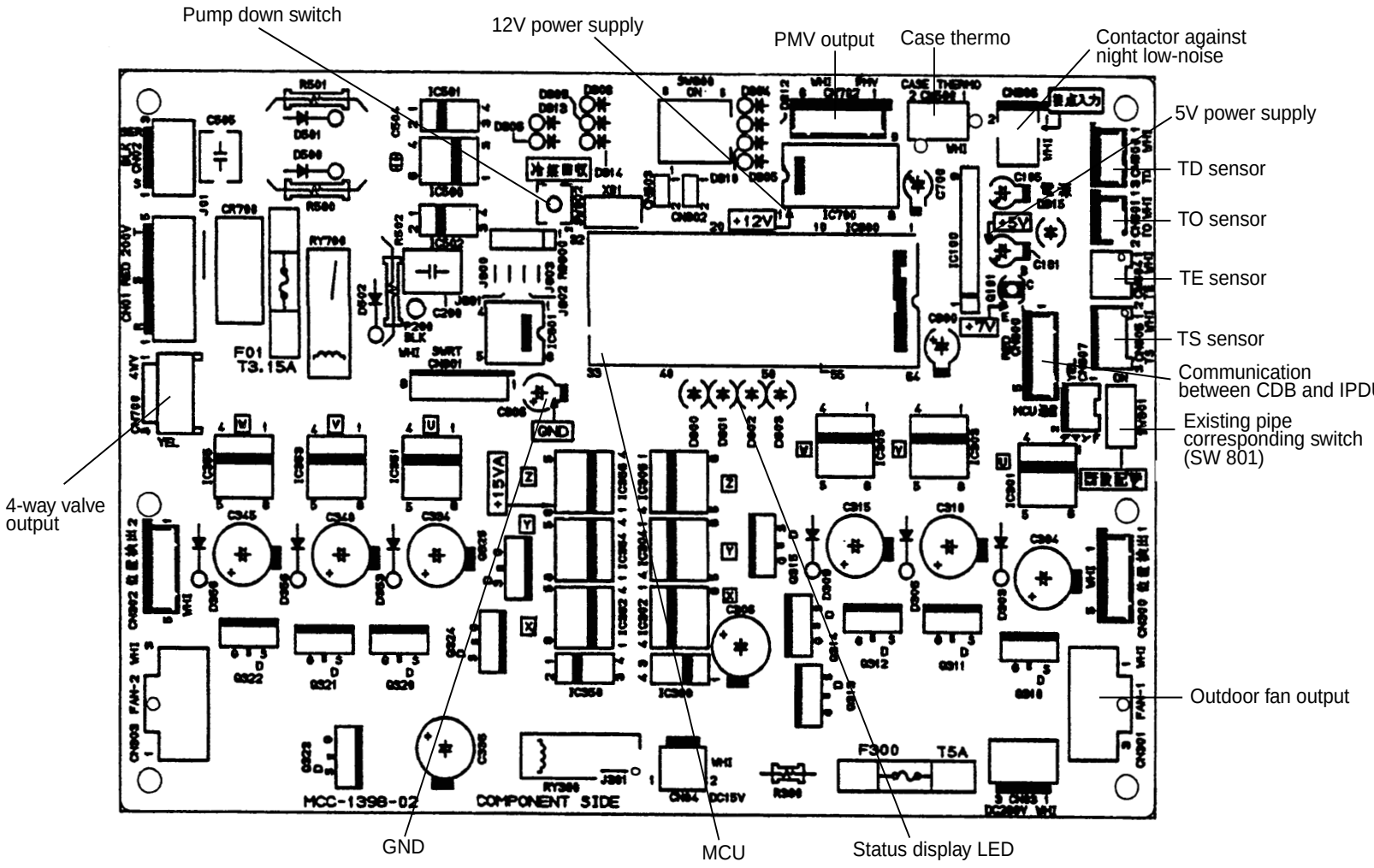

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

9-3-2. Outline of Main Controls

RAV-SM560AT-E, RAV-SM800AT-E
RAV-SM560UT-E, RAV-SM800UT-E
RAV-SM560BT-E, RAV-SM800BT-E (A02-014)

1. Outdoor fan control (Object: SM80)

Allocations of fan tap revolutions [rpm]

	W1	W2	W3	W4	W5	W6	W7	W8	W9	WA	WB	WC	WD	WE
SM800	250	270	290	310	340	370	400	440	480	520	560	610	700	780

1) Cooling fan control

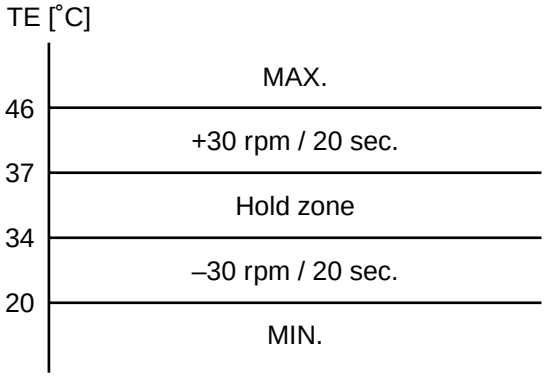
① The outdoor fan is controlled by TE sensor. (Cooling: Temperature conditions after medium term)

The cooling fan is controlled by every 1 tap of DC fan control (14 taps).

② At the activation time, although the maximum fan tap in the following table are fixed for 60 seconds, after then the fan may not rotate with high speed for several minutes because the fan is controlled by TE sensor value. It is not an abnormal status.

③ When the discharge temperature sensor is abnormal or the sensor comes off the holder, the fan does not rotate with high speed, but a protective device works.

④ When the outdoor fan does not rotate with high speed, judge a fan error by comparing the control data in the following table with TO and TE values.



Control for fan tap by outdoor temperature in normal operation

TO	TO < 5°C	5 ≤ TO <10°C	10 ≤ TO < 15°C	15 ≤ TO < 20°C	20 ≤ TO < 25°C	25°C ≤ TO	TO error
MIN	W1	W2	W3	W4	W5	WA	W1
MAX	W6	W8	WA	WC	WE	WE	WE

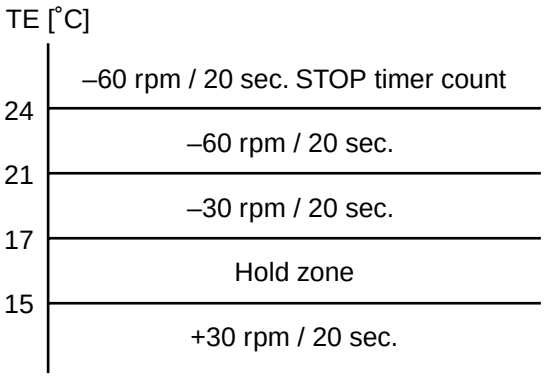
2) Heating fan control

① This control function lowers fan tap according to TE sensor value when outdoor temperature is high.

② When a status TE > 20°C is detected continuously for 5 minutes, the operation may stop. This status does not output an error code and is assumed as usual status of thermo-OFF. The fan restarts after approx. 2 minutes 30 seconds and this intermittent operation is not a trouble.

③ If the status in item ② is frequently found, it is considered that the filter of suction part of the indoor unit is dirty. Clean the filter and restart the operation.

④ This control function does not work for 30 minutes after activation, 1 minute after defrosting, and during defrost operation.



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2. Outdoor fan control (Object: SM560)

The outdoor fan is controlled by TO sensor and the revolutions frequency of the compressor (rps).
The outdoor fan is controlled by every 1 tap of DC fan control (8 taps). According to each operation mode, the fan is operated by selecting an outdoor fan operation tap in the following table based upon the conditions of TO sensor and the compressor operation (rps).

Allocations of fan tap revolutions

Tap		F1	F2	F3	F4	F5	F6	F7	F8
SM560	Revolutions per minute (rpm)	960	870	870	870	750	700	540	390

In cooling operation

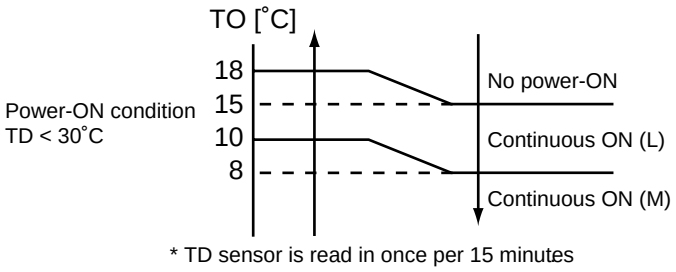
Frequency of the compressor (rps)	To 14	To 14	35 to MAX
TO ≥ 38°C	F7	F4	F3
TO < 38°C	F7	F5	F4

In heating operation

Frequency of the compressor (rps)	To 14	To 14	35 to MAX
TO ≥ 5.5°C	F7	F6	F4
TO < 5.5°C	F6	F6	F3

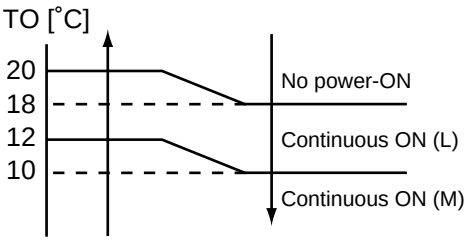
3. Coil heating control

1) This control function heats the compressor by turning on the stopped compressor instead of a case heater. It purposes to prevent slackness of the refrigerant inside of the compressor.
2) As usual, turn on power of the compressor for the specified time before a test run after installation, otherwise a trouble of the compressor may be caused. As same as a test run, it is recommended to turn on power of the compressor beforehand when starting operation after power of the compressor has been interrupted for a long time.
3) A judgment for electricity is performed by TD and TO sensors. If TO sensor is defective, a backup control is automatically performed by TE sensor. For a case of defective TO sensor, judge it with the outdoor LED display.
4) Coil heating is controlled by TD and TE sensor.
5) For every model, the power is turned off when TD is 30°C or more.



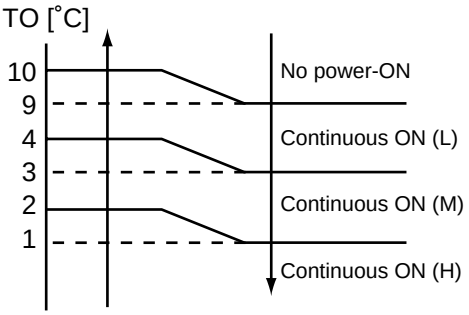
* TD sensor is read in once per 15 minutes

(In trouble of sensor)



	SM800
L	20W and equivalent
M	40W and equivalent

(Object: SM560)



	SM560
L	10W and equivalent
M	20W and equivalent
H	30W and equivalent

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NOTIFICATION

It is not an abnormal phenomenon that electro-noise may be heard while heating the coil.

4. Short intermittent operation preventive control

① The compressor may not stop for preventing the compressor for 3 to 10 minutes after start of the operation even if Thermo-OFF signal has been received from the indoor. This phenomenon is not abnormal. (Continuous operation time of the compressor differs according to the operating status.)

② If the equipment is stopped from the remote controller, the operation does not continue.

5. High-voltage suppression TE control (Only for SM800)

① This control suppresses that voltage becomes abnormally higher during cooling operation.

② Stop the compressor under condition of TE ≥ 67°C, and count 1 on the error count.

③ After 2 minutes 30 seconds passed, if TE < 67°C, the compressor restarts and the error count is cleared when the operation continues for 10 minutes.

④ When TE ≥ 67°C is detected again within 10 minutes, 1 is added to the error count and restart is repeated.

⑤ If the error counts 10 are recognized, it is determined as an error and restart is not performed. Error code 'P04' is displayed.

⑥ After restarting the compressor, continue controlling by using 70% to 90% of the control value of the current release control for minimum 30 minutes.

6. Over-current preventive control

① This control function stops the compressor when over-current preventive circuit has detected an abnormal current.

② The compressor restarts with error count 1 after 2 minutes 30 seconds.

③ If the error counts 4 are recognized, it is determined as an error and restart is not performed. Error code 'H01', 'H02' or 'P26' is displayed.

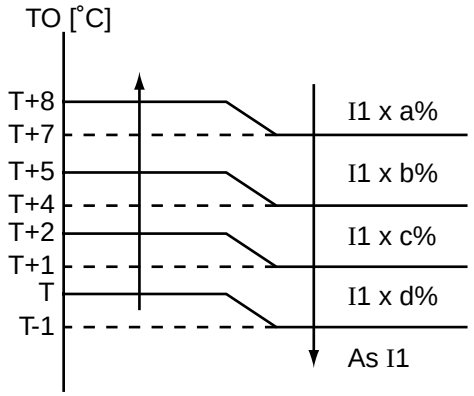
7. Current release value shift control

1) Object: SM800

① This control function prevents troubles of the electron parts such as G-Tr of inverter of compressor drive system and troubles of the compressor during cooling operation.

② This control function corrects the current release control value (I1) in item 3 of 9-2-2 by TO sensor value.

③ The value to be corrected is based upon the following control diagram and correction value table.



Corrected value

SM800	T	a	b	c	d
	39°C	40°C	60°C	80°C	85°C

2) Object: SM560

The current release value of a single-phase model is selected from the right table according to TO sensor value.

Current release value shift control

TO	SM560
45 ≤ TO	7.07
40 ≤ TO < 45	7.90
TO < 45	10.22

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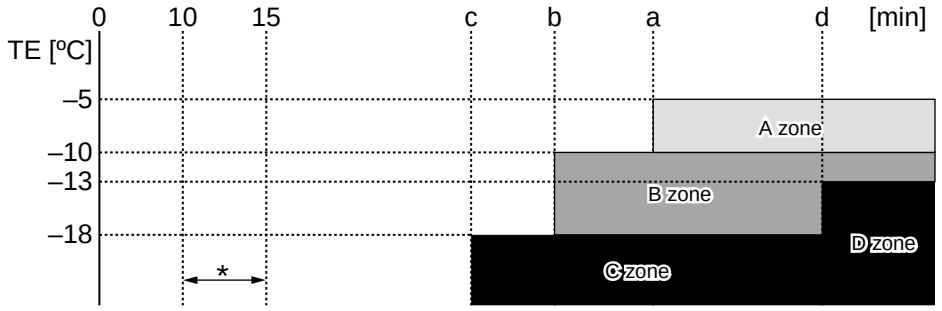
8. Defrost control

① In heating operation, defrost operation is performed when TE sensor temperature satisfies any condition in A zone to D zone.

② The defrost operation is immediately finished if TE sensor temperature has become 12°C or more, or it also is finished when condition of 7°C ≤ TE < 12°C has continued for 1 minute. The defrost operation is also finished when defrost operation has continued for 10 minutes even if TE sensor temperature has become 7°C or lower.

③ After defrost operation has finished, the compressor and the outdoor fan start heating operation after stopped for approx. 50 seconds.

Start of heating operation



* The minimum TE value between 10 and 15 minutes after heating operation has started is stored in memory as TE0.

A zone	Defrost operation is performed in this zone when TE0-TE ≥ 3 continued for T seconds.
B zone	Defrost operation is performed in this zone when TE0-TE ≥ 3 continued for T seconds.
C zone	Defrost operation is performed when this zone continued for T seconds.
D zone	Defrost operation is performed when this zone continued for T seconds.

	SM560	SM800
a	28	34
b	28	40
c	28	55
d	60	90
T	120	120

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM560AT-E, RAV-SM800AT-E, RAV-SM1100AT-E, RAV-SM1400AT-E (A03-007)

1. Pulse Modulating Valve (PMV) control

1) PMV is controlled with 50 to 500 pulses during operation, respectively.
2) In cooling operation, PMV is controlled with the temperature difference between TS sensor and TC sensor.
3) In heating operation, PMV is controlled with the temperature difference between TS sensor and TE sensor.
4) For the temperature difference in items 2) and 3), 1 to 5K is aimed as the target in both cooling and heating operations.
5) When the cycle excessively rose in both cooling and heating operations, PMV is controlled by TD sensor. The aimed value is usually 105°C for SM560 and 100°C for SM800, SM1100, SM1400 in both cooling and heating operations.

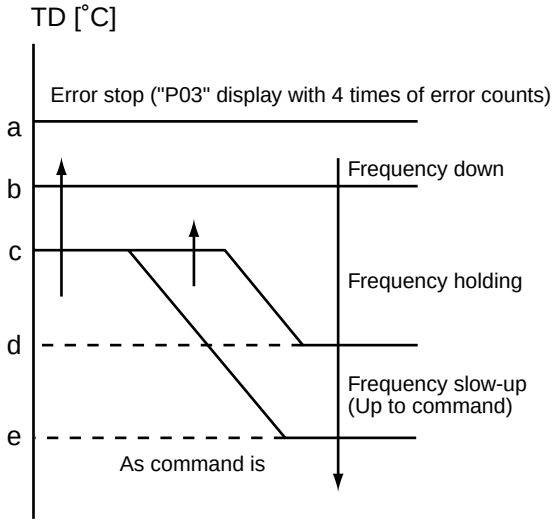
REQUIREMENT

A sensor trouble may cause a liquid back-flow or abnormal overheat resulting in excessive shortening of the compressor life. In a case of trouble on the compressor, be sure to check there is no error in the resistance value an the refrigerating cycle of each sensor after repair and then start the operation.

2. Discharge temperature release control

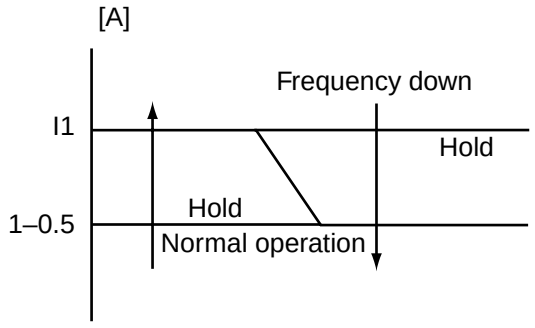
1) This function controls the operation frequency, that is, lowers the operation frequency when the discharge temperature has not lower or the discharge temperature has rapidly risen during PMV control. It subdivides the frequency control up to a unit of 0.6Hz to stabilize the cycle.
2) When the discharge temperature is detected in an abnormal stop zone, the unit stops the compressor and restarts after 2 minutes 30 seconds. The error counter is cleared when it has continued the operation for 10 minutes.
   If the abnormal stop zone has been detected by 4 times without clearing of counter, an error 'P03' is displayed.

* The cause is considered as excessively little amount of refrigerant, defective PMV, or clogging of cycle.



[°C]

	a	b	c	d	e
SM560	117	112	108	105	98
SM800, 1100, 1400	111	106	100	95	90



3. Current release control

The output frequency and the output voltage are controlled by AC current value detected by T02 on the outdoor P.C. board so that input current of the inverter does not exceed the specified value.

Objective model	SM560		SM800		SM1100		SM1400	
	COOL	HEAT	COOL	HEAT	COOL	HEAT	COOL	HEAT
I1 value [A]	9.22	11.93	12.00	13.43	18.90	19.65	19.65	19.65

* For the cooling only models, only COOL is objective.

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4. Outdoor fan control (Object: SM800, SM1100, SM1400)

Allocations of fan tap revolutions [rpm]

		W1	W2	W3	W4	W5	W6	W7	W8	W9	WA	WB	WC	WD	WE
SM800	—	250	270	290	310	340	370	400	440	480	520	560	610	700	780
SM1100	Upper fan	250	280	300	320	340	380	420	470	520	570	630	690	740	800
	Lower fan	OFF	OFF	270	290	400	480	520	560	600	660	720	780	860	940
SM1400	Upper fan	250	270	270	300	350	410	470	530	590	670	750	810	840	860
	Lower fan	OFF	OFF	240	270	330	390	450	510	570	650	730	790	820	840

1) Cooling fan control

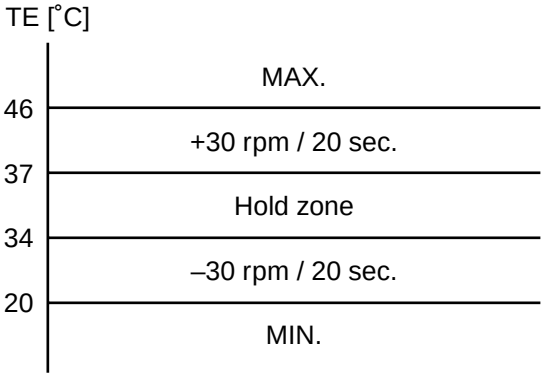
① The outdoor fan is controlled by TE sensor. (Cooling: Temperature conditions after medium term)

The cooling fan is controlled by every 1 tap of DC fan control (14 taps).

② At the activation time, although the maximum fan tap in the following table are fixed for 60 seconds, after then the fan may not rotate with high speed for several minutes because the fan is controlled by TE sensor value. It is not an abnormal status.

③ When the discharge temperature sensor is abnormal or the sensor comes off the holder, the fan does not rotate with high speed, but a protective device works.

④ When the outdoor fan does not rotate with high speed, judge a fan error by comparing the control data in the following table with TO and TE values.



Control for fan tap by outdoor temperature in normal operation

TO	TO < 5°C	5 ≤ TO <10°C	10 ≤ TO < 15°C	15 ≤ TO < 20°C	20 ≤ TO < 25°C	25°C ≤ TO	TO error
MIN	W1	W2	W3	W4	W5	WA	W1
MAX	W6	W8	WA	WC	WE	WE	WE

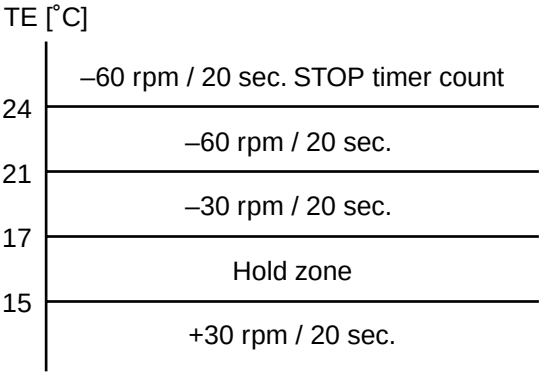
2) Heating fan control

① This control function lowers fan tap according to TE sensor value when outdoor temperature is high.

② When a status TE > 20°C is detected continuously for 5 minutes, the operation may stop. This status does not output an error code and is assumed as usual status of thermo-OFF. The fan restarts after approx. 2 minutes 30 seconds and this intermittent operation is not a trouble.

③ If the status in item ② is frequently found, it is considered that the filter of suction part of the indoor unit is dirty. Clean the filter and restart the operation.

④ This control function does not work for 30 minutes after activation, 1 minute after defrosting, and during defrost operation.



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5. Outdoor fan control (Object: SM560)

The outdoor fan is controlled by TO sensor and the revolutions frequency of the compressor (rps).
The outdoor fan is controlled by every 1 tap of DC fan control (8 taps). According to each operation mode, the fan is operated by selecting an outdoor fan operation tap in the following table based upon the conditions of TO sensor and the compressor operation (rps).

Allocations of fan tap revolutions

Tap		F1	F2	F3	F4	F5	F6	F7	F8
SM560	Revolutions per minute (rpm)	960	870	870	870	750	700	540	390

In cooling operation

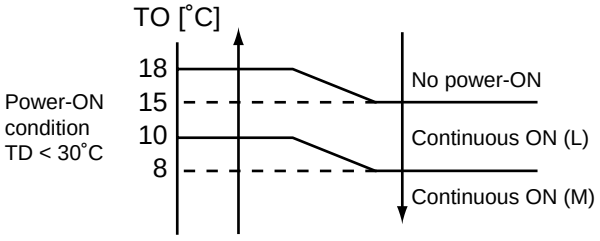
Frequency of the compressor (rps)	To 14	To 14	35 to MAX
TO ≥ 38°C	F7	F4	F3
TO < 38°C	F7	F5	F4

In heating operation

Frequency of the compressor (rps)	To 14	To 14	35 to MAX
TO ≥ 5.5°C	F7	F6	F4
TO < 5.5°C	F6	F6	F3

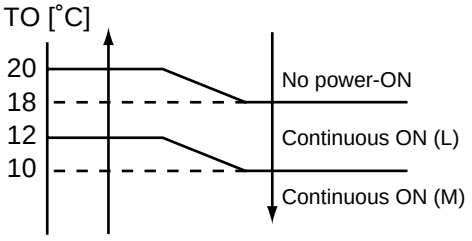
6. Coil heating control

1) This control function heats the compressor by turning on the stopped compressor instead of a case heater. It purposes to prevent slackness of the refrigerant inside of the compressor.
2) As usual, turn on power of the compressor for the specified time before a test run after installation, otherwise a trouble of the compressor may be caused. As same as a test run, it is recommended to turn on power of the compressor beforehand when starting operation after power of the compressor has been interrupted for a long time.
3) A judgment for electricity is performed by TD and TO sensors. If TO sensor is defective, a backup control is automatically performed by TE sensor. For a case of defective TO sensor, judge it with the outdoor LED display.
4) Coil heating is controlled by TD and TE sensor.
5) For every model, the power is turned off when TD is 30°C or more.



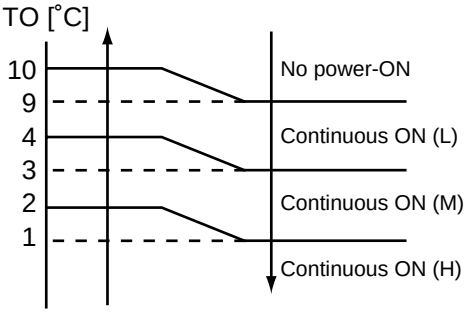
* TD sensor is read in once per 15 minutes

(In trouble of sensor)



	SM800	SM1100	SM1400
L	20W and equivalent	20W and equivalent	25W and equivalent
M	40W and equivalent	40W and equivalent	50W and equivalent

(Object: SM560)



	SM560
L	10W and equivalent
M	20W and equivalent
H	30W and equivalent

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NOTIFICATION

It is not an abnormal phenomenon that electro-noise may be heard while heating the coil.

7. Short intermittent operation preventive control

① The compressor may not stop for preventing the compressor for 3 to 10 minutes after start of the operation even if Thermo-OFF signal has been received from the indoor. This phenomenon is not abnormal. (Continuous operation time of the compressor differs according to the operating status.)

② If the equipment is stopped from the remote controller, the operation does not continue.

8. High-pressure suppression TE control (For SM800)

① This control suppresses that pressure becomes abnormally higher during cooling operation.

② Stop the compressor under condition of TE ≥ 67°C, and count 1 on the error count.

③ After 2 minutes 30 seconds passed, if TE < 67°C, the compressor restarts and the error count is cleared when the operation continues for 10 minutes.

④ When TE ≥ 67°C is detected again within 10 minutes, 1 is added to the error count and restart is repeated.

⑤ If the error counts 10 are recognized, it is determined as an error and restart is not performed. Error code 'P04' is displayed.

⑥ After restarting the compressor, continue controlling by using 70% to 90% of the control value of the current release control for minimum 30 minutes.

9. Over-current preventive control

① This control function stops the compressor when over-current preventive circuit has detected an abnormal current.

② The compressor restarts with error count 1 after 2 minutes 30 seconds.

③ If the error counts 4 are recognized, it is determined as an error and restart is not performed. Error code 'H01', 'H02' or 'P26' is displayed.

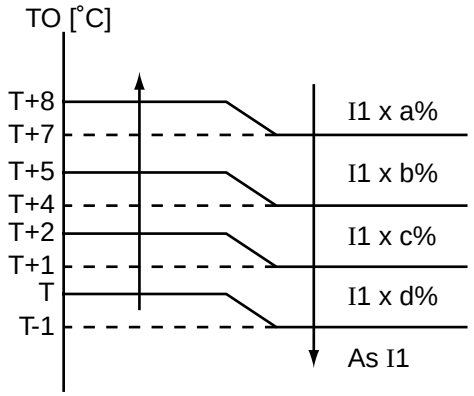
10. Current release value shift control

1) For SM800, SM1100, SM1400

① This control function prevents troubles of the electron parts such as G-Tr of inverter of compressor drive system and troubles of the compressor during cooling operation.

② This control function corrects the current release control value (I1) in item 3 of 9-1. by Current release control.

③ The value to be corrected is based upon the following control diagram and correction value table.



Corrected value

	T	a	b	c	d
SM800	39°C	40%	60%	80%	85%
SM1100	39°C	50%	70%	80%	90%
SM1400	39°C	70%	80%	90%	95%

2) For SM560

The current release value of a single-phase model is selected from the right table according to TO sensor value.

Current release value shift control

TO	SM560
45 ≤ TO	5.92
40 ≤ TO < 45	6.75
TO < 40	9.00

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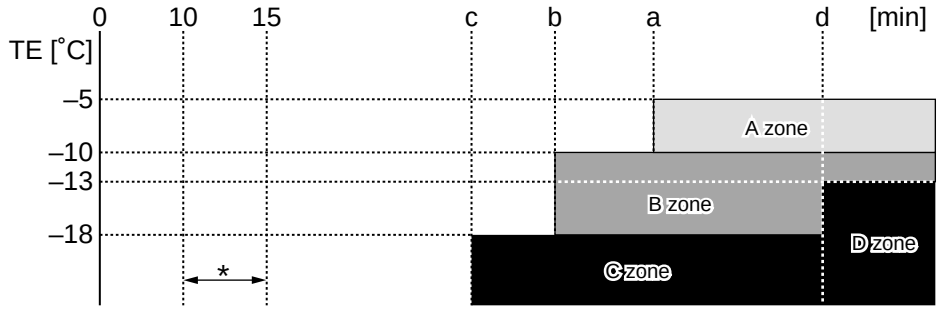
11. Defrost control

① In heating operation, defrost operation is performed when TE sensor temperature satisfies any condition in A zone to D zone.

② The defrost operation is immediately finished if TE sensor temperature has become 12°C or more, or it also is finished when condition of 7°C ≤ TE < 12°C has continued for 1 minute. The defrost operation is also finished when defrost operation has continued for 10 minutes even if TE sensor temperature has become 7°C or lower.

③ After defrost operation has finished, the compressor and the outdoor fan start heating operation after stopped for approx. 50 seconds.

Start of heating operation



* The minimum TE value between 10 and 15 minutes after heating operation has started is stored in memory as TE0.

A zone	Defrost operation is performed in this zone when TE0-TE ≥ 3 continued for T seconds.
B zone	Defrost operation is performed in this zone when TE0-TE ≥ 3 continued for T seconds.
C zone	Defrost operation is performed when this zone continued for T seconds.
D zone	Defrost operation is performed when this zone continued for T seconds.

	SM560	SM800, SM1100, SM1400
a	28	34
b	28	40
c	28	55
d	60	90
T	120	20

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RAV-SM1100AT-E, RAV-SM1400AT-E (A03-003)

1. Pulse Modulating Valve (PMV) control

1) For PMV, SM1100 is controlled with 45 to 500 pulses and SM1400 with 50 to 500 pulses during operation, respectively.
2) In cooling operation, PMV is controlled with the temperature difference between TS sensor and TC sensor.
3) In heating operation, PMV is controlled with the temperature difference between TS sensor and TE sensor.
4) For the temperature difference in items 2) and 3), 1 to 5K is aimed as the target in both cooling and heating operations.
5) When the cycle excessively rose in both cooling and heating operations, PMV is controlled by TD sensor. The aimed value is usually 105°C for SM1100 and 100°C for SM1400 in both cooling and heating operations.

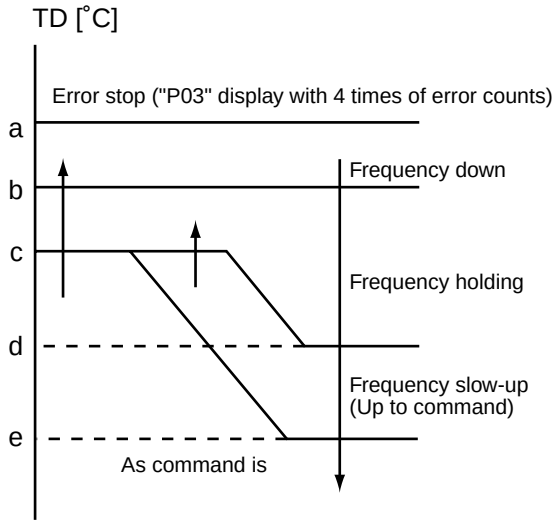
REQUIREMENT

A sensor trouble may cause a liquid back-flow or abnormal overheat resulting in excessive shortening of the compressor life. In a case of trouble on the compressor, be sure to check there is no error in the resistance value an the refrigerating cycle of each sensor after repair and then start the operation.

2. Discharge temperature release control

1) This function controls the operation frequency, that is, lowers the operation frequency when the discharge temperature has not lower or the discharge temperature has rapidly risen during PMV control. It subdivides the frequency control up to a unit of 0.6Hz to stabilize the cycle.
2) When the discharge temperature is detected in an abnormal stop zone, the unit stops the compressor and restarts after 2 minutes 30 seconds. The error counter is cleared when it has continued the operation for 10 minutes. If the abnormal stop zone has been detected by 4 times without clearing of counter, an error 'P03' is displayed.

* The cause is considered as excessively little amount of refrigerant, defective PMV, or clogging of cycle.

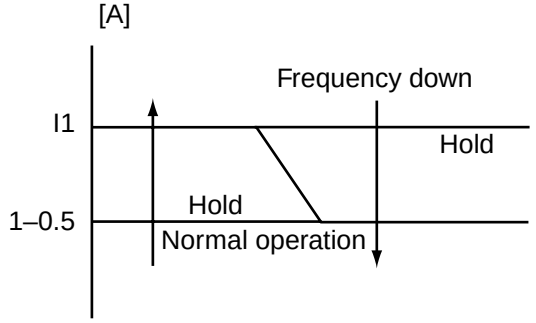


[°C]

	a	b	c	d	e
SM1100 SM1400	111	106	100	95	90

3. Current release control

The output frequency and the output voltage are controlled by AC current value detected by T02 on the outdoor P.C. board so that input current of the inverter does not exceed the specified value.



Objective model	SM1100		SM1400	
	COOL	HEAT	COOL	HEAT
I1 value [A]	18.90	19.65	19.65	19.65

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4. Outdoor fan control

Allocations of fan tap revolutions [rpm]

		W1	W2	W3	W4	W5	W6	W7	W8	W9	WA	WB	WC	WD	WE
SM1100	Upper fan	250	280	300	320	340	380	420	470	520	570	630	690	740	800
	Lower fan	OFF	OFF	270	290	400	480	520	560	600	660	720	780	860	940
SM1400	Upper fan	250	270	270	300	350	410	470	530	590	670	750	810	840	860
	Lower fan	OFF	OFF	240	270	330	390	450	510	570	650	730	790	820	840

1) Cooling fan control

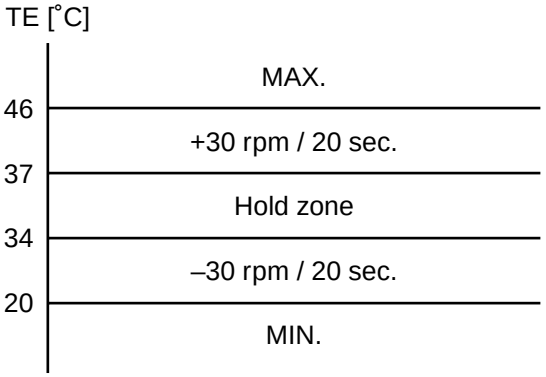
① The outdoor fan is controlled by TE sensor. (Cooling: Temperature conditions after medium term)

The cooling fan is controlled by every 1 tap of DC fan control (14 taps).

② At the activation time, although the maximum fan tap in the following table are fixed for 60 seconds, after then the fan may not rotate with high speed for several minutes because the fan is controlled by TE sensor value. It is not an abnormal status.

③ When the discharge temperature sensor is abnormal or the sensor comes off the holder, the fan does not rotate with high speed, but a protective device works.

④ When the outdoor fan does not rotate with high speed, judge a fan error by comparing the control data in the following table with TO and TE values.



Control for fan tap by outdoor temperature in normal operation

TO	TO < 5°C	5 ≤ TO <10°C	10 ≤ TO < 15°C	15 ≤ TO < 20°C	20 ≤ TO < 25°C	25°C ≤ TO	TO error
MIN	W1	W2	W3	W4	W5	WA	W1
MAX	W6	W8	WA	WC	WE	WE	WE

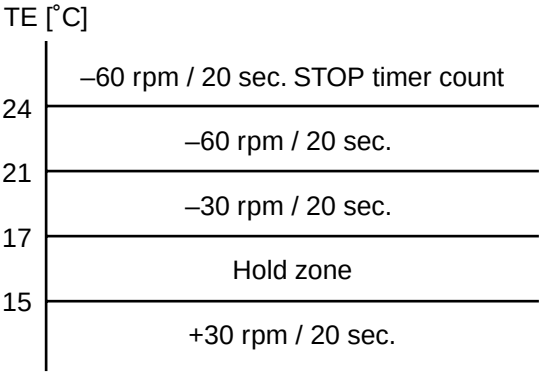
2) Heating fan control

① This control function lowers fan tap according to TE sensor value when outdoor temperature is high.

② When a status TE > 20°C is detected continuously for 5 minutes, the operation may stop. This status does not output an error code and is assumed as usual status of thermo-OFF. The fan restarts after approx. 2 minutes 30 seconds and this intermittent operation is not a trouble.

③ If the status in item ② is frequently found, it is considered that the filter of suction part of the indoor unit is dirty. Clean the filter and restart the operation.

④ This control function does not work for 30 minutes after activation, 1 minute after defrosting, and during defrost operation.



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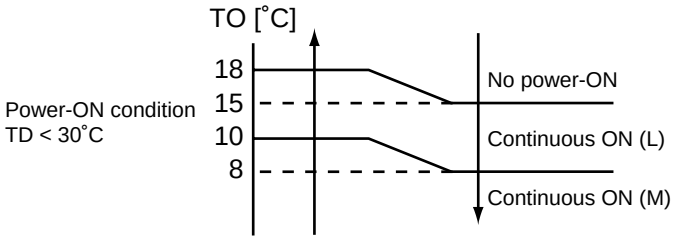
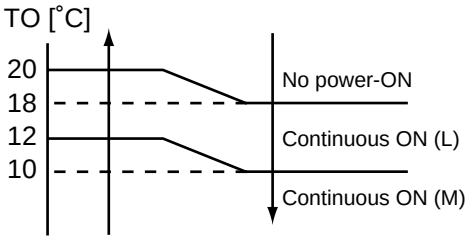
5. Coil heating control

1) This control function heats the compressor by turning on the stopped compressor instead of a case heater. It purposes to prevent slackness of the refrigerant inside of the compressor.
2) As usual, turn on power of the compressor for the specified time before a test run after installation, otherwise a trouble of the compressor may be caused. As same as a test run, it is recommended to turn on power of the compressor beforehand when starting operation after power of the compressor has been interrupted for a long time.
3) A judgment for electricity is performed by TD and TO sensors. If TO sensor is defective, a backup control is automatically performed by TE sensor. For a case of defective TO sensor, judge it with the outdoor LED display.
4) Coil heating is controlled by TD and TE sensor.
5) For every model, the power is turned off when TD is 30°C or more.



* TD sensor is read in once per 15 minutes

(In trouble of sensor)



	SM1100	SM1400
L	20W and equivalent	25W and equivalent
M	40W and equivalent	50W and equivalent

NOTIFICATION

It is not an abnormal phenomenon that electro-noise may be heard while heating the coil.

6. Short intermittent operation preventive control

① The compressor may not stop for preventing the compressor for 3 to 10 minutes after start of the operation even if Thermo-OFF signal has been received from the indoor. This phenomenon is not abnormal. (Continuous operation time of the compressor differs according to the operating status.)

② If the equipment is stopped from the remote controller, the operation does not continue.

7. High-pressure suppression TE control

① This control suppresses that pressure becomes abnormally higher during cooling operation.

② Stop the compressor under condition of TE ≥ 67°C, and count 1 on the error count.

③ After 2 minutes 30 seconds passed, if TE < 67°C, the compressor restarts and the error count is cleared when the operation continues for 10 minutes.

④ When TE ≥ 67°C is detected again within 10 minutes, 1 is added to the error count and restart is repeated.

⑤ If the error counts 10 are recognized, it is determined as an error and restart is not performed. Error code 'P04' is displayed.

⑥ After restarting the compressor, continue controlling by using 70% to 90% of the control value of the current release control for minimum 30 minutes.

8. Over-current preventive control

① This control function stops the compressor when over-current preventive circuit has detected an abnormal current.

② The compressor restarts with error count 1 after 2 minutes 30 seconds.

③ If the error counts 4 are recognized, it is determined as an error and restart is not performed. Error code 'H01', 'H02' or 'P26' is displayed.

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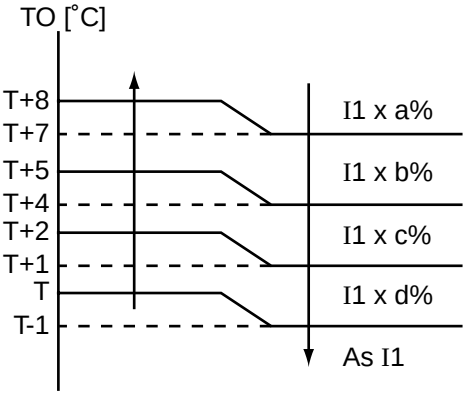
9. Current release value shift control

① This control function prevents troubles of the electron parts such as G-Tr of inverter of compressor drive system and troubles of the compressor during cooling operation.

② This control function corrects the current release control value (I1) in item 3 of 7-1. by Current release control.

③ The value to be corrected is based upon the following control diagram and correction value table.



Corrected value

	T	a	b	c	d
SM1100	39°C	50%	70%	80%	90%
SM1400	39°C	70%	80%	90%	95%

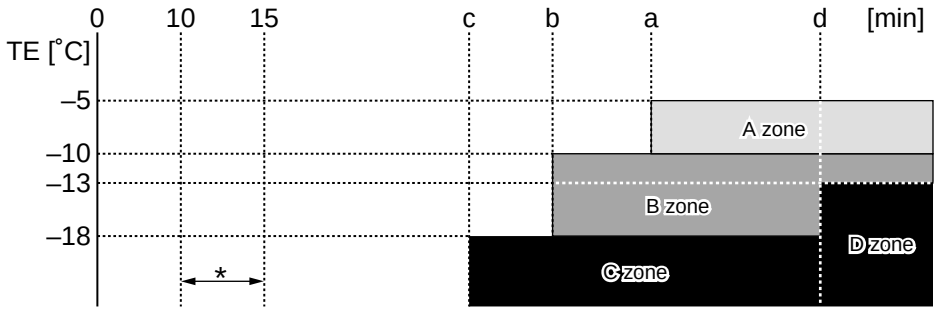
10. Defrost control

① In heating operation, defrost operation is performed when TE sensor temperature satisfies any condition in A zone to D zone.

② The defrost operation is immediately finished if TE sensor temperature has become 12°C or more, or it also is finished when condition of 7°C ≤ TE < 12°C has continued for 1 minute. The defrost operation is also finished when defrost operation has continued for 10 minutes even if TE sensor temperature has become 7°C or lower.

③ After defrost operation has finished, the compressor and the outdoor fan start heating operation after stopped for approx. 50 seconds.

Start of heating operation



* The minimum TE value between 10 and 15 minutes after heating operation has started is stored in memory as TE0.

A zone	Defrost operation is performed in this zone when TE0-TE ≥ 3 continued for T seconds.
B zone	Defrost operation is performed in this zone when TE0-TE ≥ 3 continued for T seconds.
C zone	Defrost operation is performed when this zone continued for T seconds.
D zone	Defrost operation is performed when this zone continued for T seconds.

	SM1100, SM1400
a	34
b	40
c	55
d	90
T	20

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RAV-SP1100UT-E, RAV-SP560AT-E, RAV-SP800AT-E, RAV-SP1100AT-E, RAV-SP1400AT-E

1. Pulse Modulating Valve (PMV) control

1) PMV is controlled with 50 to 500 pulses during operation, respectively.
2) In cooling operation, PMV is controlled with the temperature difference between TS sensor and TC sensor.
3) In heating operation, PMV is controlled with the temperature difference between TS sensor and TE sensor.
4) For the temperature difference in items 2) and 3), 1 to 5K is aimed as the target in both cooling and heating operations.
5) When the cycle excessively rose in both cooling and heating operations, PMV is controlled by TD sensor. The aimed value is usually 100°C in both cooling and heating operations.

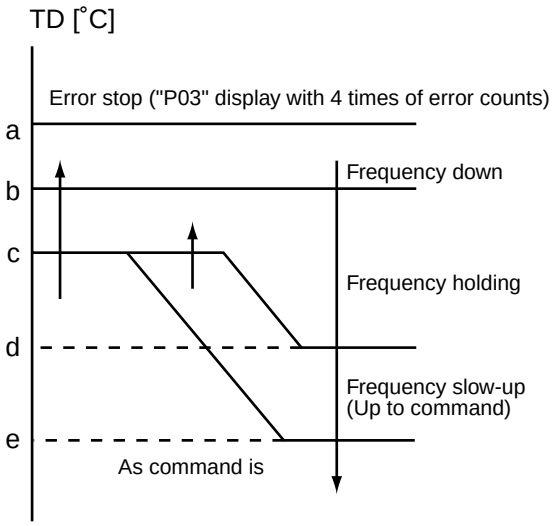
REQUIREMENT

A sensor trouble may cause a liquid back-flow or abnormal overheat resulting in excessive shortening of the compressor life. In a case of trouble on the compressor, be sure to check there is no error in the resistance value an the refrigerating cycle of each sensor after repair and then start the operation.

2. Discharge temperature release control

1) This function controls the operation frequency, that is, lowers the operation frequency when the discharge temperature has not lower or the discharge temperature has rapidly risen during PMV control. It subdivides the frequency control up to a unit of 0.6Hz to stabilize the cycle.
2) When the discharge temperature is detected in an abnormal stop zone, the unit stops the compressor and restarts after 2 minutes 30 seconds. The error counter is cleared when it has continued the operation for 10 minutes.
   If the abnormal stop zone has been detected by 4 times without clearing of counter, an error 'P03' is displayed.

* The cause is considered as excessively little amount of refrigerant, defective PMV, or clogging of cycle.

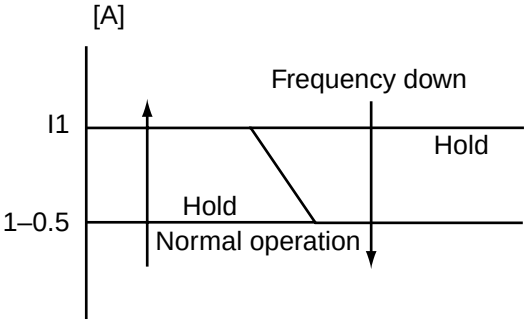


[°C]

a	b	c	d	e
111	106	100	95	90

3. Current release control

The output frequency and the output voltage are controlled by AC current value detected by T02 on the outdoor P.C. board so that input current of the inverter does not exceed the specified value.



Objective model	SP560		SP800		SP1100		SP1400	
	COOL	HEAT	COOL	HEAT	COOL	HEAT	COOL	HEAT
I1 value [A]	11.55	13.43	11.55	13.43	19.65	19.65	19.65	19.65

* For the cooling only models, only COOL is objective.

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4. Outdoor fan control (Object: RAV-SP560AT-E, RAV-SP800AT-E, RAV-SP1100AT-E, RAV-SP1400AT-E)

Allocations of fan tap revolutions [rpm]

		W1	W2	W3	W4	W5	W6	W7	W8	W9	WA	WB	WC	WD	WE	WF
SP560	Upper fan	250	270	290	310	340	370	400	440	480	520	560	610	700	700	810
	Lower fan	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
SP800	Upper fan	250	270	290	310	340	370	400	440	480	520	560	610	700	700	810
	Lower fan	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
SP1100	Upper fan	250	270	270	300	350	410	470	530	590	670	750	750	760	760	860
	Lower fan	—	—	250	280	330	390	450	510	570	650	730	730	740	740	840
SP1400	Upper fan	250	270	270	300	350	410	470	530	590	670	750	860	860	860	860
	Lower fan	—	—	250	280	330	390	450	510	570	650	730	840	840	840	840

1) Cooling fan control

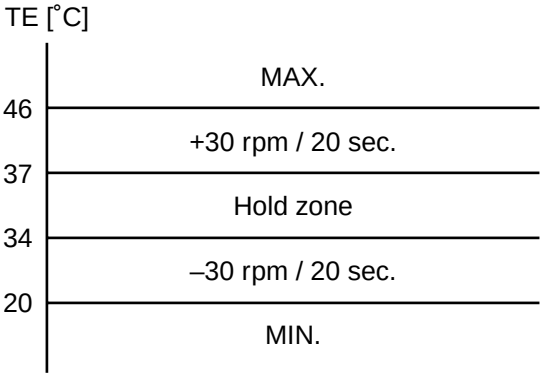
① The outdoor fan is controlled by TE sensor.
(Cooling: Temperature conditions after medium term)

The cooling fan is controlled by every 1 tap of DC fan control (14 taps).

② At the activation time, although the maximum fan tap in the following table are fixed for 60 seconds, after then the fan may not rotate with high speed for several minutes because the fan is controlled by TE sensor value. It is not an abnormal status.

③ When the discharge temperature sensor is abnormal or the sensor comes off the holder, the fan does not rotate with high speed, but a protective device works.

④ When the outdoor fan does not rotate with high speed, judge a fan error by comparing the control data in the following table with TO and TE values.



While the outdoor temperature is low (TO < 5°C), the outdoor fan may not operate.

Control for fan tap by outdoor temperature in normal operation

TO	TO < –5°C	–5 ≤ TO <0°C	0 ≤ TO < 5°C	5 ≤ TO < 15°C	15 ≤ TO < 29°C	29°C ≤ TO	TO error
MIN	OFF	W1	W1	W2	W3	W5	W1
MAX	W3	W5	W7	W9	WB	WF	WE

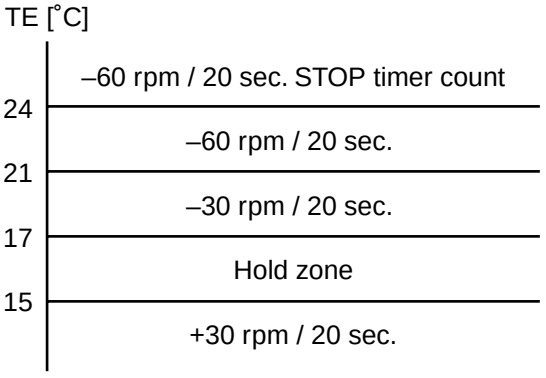
2) Heating fan control

① This control function lowers fan tap according to TE sensor value when outdoor temperature is high.

② When a status TE > 20°C is detected continuously for 5 minutes, the operation may stop. This status does not output an error code and is assumed as usual status of thermo-OFF. The fan restarts after approx. 2 minutes 30 seconds and this intermittent operation is not a trouble.

③ If the status in item ② is frequently found, it is considered that the filter of suction part of the indoor unit is dirty. Clean the filter and restart the operation.

④ This control function does not work for 30 minutes after activation, 1 minute after defrosting, and during defrost operation.



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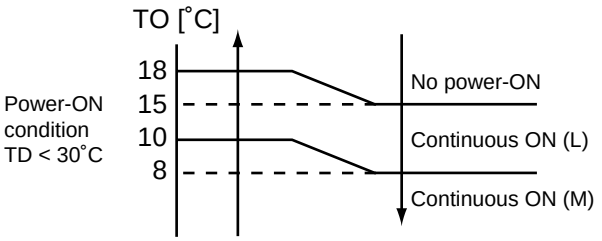
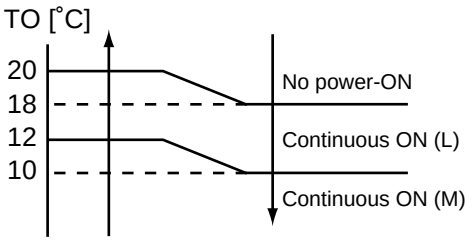
5. Coil heating control

1) This control function heats the compressor by turning on the stopped compressor instead of a case heater. It purposes to prevent slackness of the refrigerant inside of the compressor.
2) As usual, turn on power of the compressor for the specified time before a test run after installation, otherwise a trouble of the compressor may be caused. As same as a test run, it is recommended to turn on power of the compressor beforehand when starting operation after power of the compressor has been interrupted for a long time.
3) A judgment for electricity is performed by TD and TO sensors. If TO sensor is defective, a backup control is automatically performed by TE sensor. For a case of defective TO sensor, judge it with the outdoor LED display.
4) Coil heating is controlled by TD and TE sensor.
5) For every model, the power is turned off when TD is 30°C or more.



* TD sensor is read in once per 15 minutes

(In trouble of sensor)



	SP560, SP800	SP1100, SP1400
L	20W and equivalent	30W and equivalent
M	40W and equivalent	50W and equivalent

NOTIFICATION

It is not an abnormal phenomenon that electro-noise may be heard while heating the coil.

6. Short intermittent operation preventive control

① The compressor may not stop for preventing the compressor for 3 to 10 minutes after start of the operation even if Thermo-OFF signal has been received from the indoor. This phenomenon is not abnormal. (Continuous operation time of the compressor differs according to the operating status.)

② If the equipment is stopped from the remote controller, the operation does not continue.

7. High-pressure suppression TE control

① This control suppresses that pressure becomes abnormally higher during cooling operation.

② Stop the compressor under condition of TE ≥ 67°C, and count 1 on the error count.

③ After 2 minutes 30 seconds passed, if TE < 67°C, the compressor restarts and the error count is cleared when the operation continues for 10 minutes.

④ When TE ≥ 67°C is detected again within 10 minutes, 1 is added to the error count and restart is repeated.

⑤ If the error counts 10 are recognized, it is determined as an error and restart is not performed. Error code 'P04' is displayed.

⑥ After restarting the compressor, continue controlling by using 70% to 90% of the control value of the current release control for minimum 30 minutes.

8. Over-current preventive control

① This control function stops the compressor when over-current preventive circuit has detected an abnormal current.

② The compressor restarts with error count 1 after 2 minutes 30 seconds.

③ If the error counts 4 are recognized, it is determined as an error and restart is not performed. Error code 'H01', 'H02' or 'P26' is displayed.

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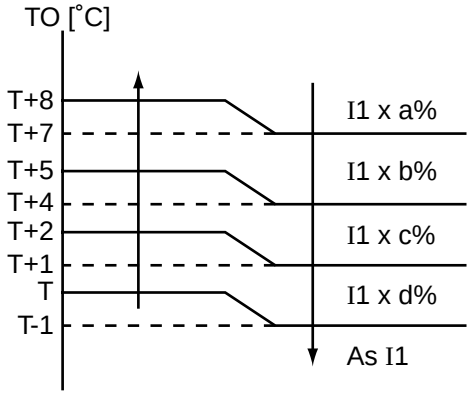
9. Current release value shift control

① This control function prevents troubles of the electron parts such as G-Tr of inverter of compressor drive system and troubles of the compressor during cooling operation.

② This control function corrects the current release control value (I1) in item 3 of 9-1. by Current release control.

③ The value to be corrected is based upon the following control diagram and correction value table.



Corrected value

	T	a	b	c	d
SP560	39°C	40%	60%	80%	85%
SP800	39°C	40%	60%	75%	85%
SP1100, SP1400	39°C	70%	80%	90%	95%

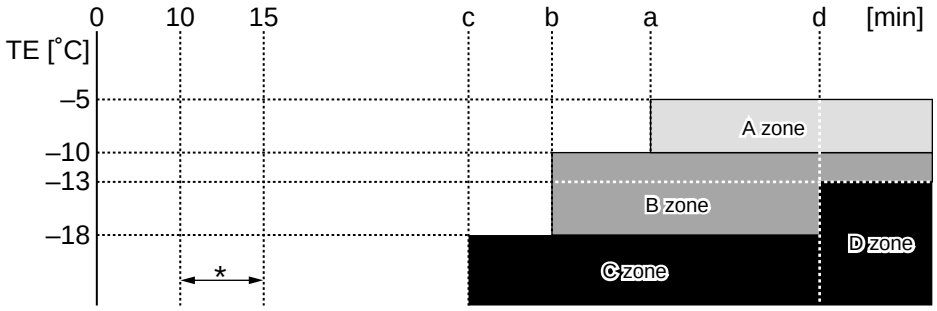
10. Defrost control

① In heating operation, defrost operation is performed when TE sensor temperature satisfies any condition in A zone to D zone.

② The defrost operation is immediately finished if TE sensor temperature has become 12°C or more, or it also is finished when condition of 7°C ≤ TE < 12°C has continued for 1 minute. The defrost operation is also finished when defrost operation has continued for 10 minutes even if TE sensor temperature has become 7°C or lower.

③ After defrost operation has finished, the compressor and the outdoor fan start heating operation after stopped for approx. 50 seconds.

Start of heating operation



* The minimum TE value between 10 and 15 minutes after heating operation has started is stored in memory as TE0.

A zone	Defrost operation is performed in this zone when TE0-TE ≥ 3 continued for T seconds.
B zone	Defrost operation is performed in this zone when TE0-TE ≥ 3 continued for T seconds.
C zone	Defrost operation is performed when this zone continued for T seconds.
D zone	Defrost operation is performed when this zone continued for T seconds.

a	b	c	d	T
55	45	40	90	20

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10. TROUBLESHOOTING

10-1. Summary of Troubleshooting

<Wired remote controller type>

1. Before troubleshooting

1) Required tools/instruments
   - ⊕ and ⊖ screwdrivers, spanners, radio cutting pliers, nippers, push pins for reset switch
   - Tester, thermometer, pressure gauge, etc.

2) Confirmation points before check

① The following operations are normal.

a) Compressor does not operate.
   - Is not 3-minutes delay (3 minutes after compressor OFF)?
   - Does not thermostat turn off?
   - Does not timer operate during fan operation?
   - Is not outside high-temperature operation controlled in heating operation?

b) Indoor fan does not rotate.
   - Does not cool air discharge preventive control work in heating operation?

c) Outdoor fan does not rotate or air volume changes.
   - Does not high-temperature release operation control work in heating operation?
   - Does not outside low-temperature operation control work in cooling operation?
   - Is not defrost operation performed?

d) ON/OFF operation cannot be performed from remote controller.
   - Is not the control operation performed from outside/remote side?
   - Is not automatic address being set up?
     (When the power is turned on at the first time or when indoor unit address setting is changed, the operation cannot be performed for maximum approx. 5 minutes after power-ON.)

② Did you return the cabling to the initial positions?

③ Are connecting cables of indoor unit and remote controller correct?

(2) Troubleshooting procedure

When a trouble occurred, check the parts along with the following procedure.

Trouble → **Confirmation of check code display** → **Check defective position and parts.**

NOTE :
For cause of a trouble, power conditions or malfunction/erroneous diagnosis of microcomputer due to outer noise is considered except the items to be checked. If there is any noise source, change the cables of the remote controller to shield cables.

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<Wireless remote controller type> (Only for 4-way air discharge cassette type models)

1. Before troubleshooting

1) Required tools/instruments
   - ⊕ and ⊖ screwdrivers, spanners, radio cutting pliers, nippers, etc.
   - Tester, thermometer, pressure gauge, etc.
2) Confirmation points before check
   ① The following operations are normal.
   a) Compressor does not operate.
      - Is not 3-minutes delay (3 minutes after compressor OFF)?
      - Does not thermostat turn off?
      - Does not timer operate during fan operation?
      - Is not outside high-temperature operation controlled in heating operation?

   b) Indoor fan does not rotate.
      - Does not cool air discharge preventive control work in heating operation?
3) Outdoor fan does not rotate or air volume changes.
   - Does not high-temperature release operation control work in heating operation?
   - Does not outside low-temperature operation control work in cooling operation?
   - Is not defrost operation performed?
4) ON/OFF operation cannot be performed from remote controller.
   - Is not forced operation performed?
   - Is not the control operation performed from outside/remote side?
   - Is not automatic address being set up?

   ① Did you return the cabling to the initial positions?
   ② Are connecting cables between indoor unit and receiving unit correct?

2. Troubleshooting procedure

(When the power is turned on at the first time or when indoor unit address setting is changed, the operation cannot be performed for maximum approx. 5 minutes after power-ON.)

When a trouble occurred, check the parts along with the following procedure.

Trouble → Confirmation of lamp display (When 4-way air discharge cassette type wireless remote controller is connected) → Check defective position and parts.

1) Outline of judgment

   The primary judgment to check where a trouble occurred in indoor unit or outdoor unit is performed with the following method.

Method to judge the erroneous position by flashing indication on the display part of indoor unit (sensors of the receiving unit)

The indoor unit monitors operating status of the air conditioner, and the blocked contents of self-diagnosis are displayed restricted to the following cases if a protective circuit works.

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10-2. Check Code List

Error mode detected by indoor unit

◎ : Flash, ○ : Go on, ● : Go off

Wireless sensor lamp display			Wired remote controller	Diagnostic function			Judgment and measures
Operation	Timer	Ready	Check code	Cause of operation	Status of air conditioner	Condition	
◎	●	●	E03	No communication from remote controller (including wireless) and communication adapters	Stop (Automatic reset)	Displayed when error is detected	1. Check cables of remote controller and communication adapters. • Handy remote controller LCD display OFF (Disconnection) • Central remote controller [97] check code
●	●	◎	E04	The serial signal is not output from outdoor unit to indoor unit. • Miscabling of inter-unit cables • Defective serial sensing circuit on outdoor P.C. board • Defective serial receiving circuit on indoor P.C. board	S top (Automatic reset)	Displayed when error is detected	1. Outdoor unit does not completely operate. • Inter-unit cable check, correction of miscabling, case thermo operation • Outdoor P.C. board check, P.C. board cables check 2. In normal operation P.C. board (Indoor receiving/Outdoor sending) check
◎	●	●	E08	Duplicated indoor unit addresses	Stop	Displayed when error is detected	1. Check whether there is modification of remote controller connection (Group/ Individual) or not after power has been turned on (finish of group configuration/ address check). * If group configuration and address are not normal when the power has been turned on, the mode automatically shifts to address setup mode. (Resetting of address)
◎	●	◎	L03	Duplicated indoor master units			
◎	●	◎	L07	There is group line in individual indoor units.			
◎	●	◎	L08	Unsetting of indoor group address			
◎	●	◎	L09	Unset indoor capacity	Stop	Displayed when error is detected	1. Set the indoor capacity. (DN=I1)
◎	○	◎	L30	Abnormal outside interlock input	Stop	Displayed when error is detected	1. Check outside devices. 2. Check indoor P.C. board.
●	◎	◎	P01	Fan motor thermal protection	Stop	Displayed when error is detected	1. Check thermal relay of fan motor. 2. Check indoor P.C. board.
●	◎	◎	P10	Float switch operation • Disconnection, coming-off, defective float switch contactor of float circuit	Stop	Displayed when error is detected	1. Defect of drain pump 2. Clogging of drain pump 3. Check float switch. 4. Check indoor P.C. board.
●	◎	◎	P12	Indoor DC fan error	Stop	Displayed when error is detected	1. Defective detection of position 2. Over-current protective circuit of indoor fan driving unit operates. 3. Lock of indoor fan 4. Check indoor P.C. board.
◎	●	◎	P19	Error in 4-way valve system • Indoor heat exchanger temperature lowered after start of heating operation.	Stop (Automatic reset)	Displayed when error is detected	1. Check 4-way valve. 2. Check indoor heat exchanger (TC/TCJ) sensor. 3. Check indoor P.C. board.
◎	●	◎	P31	Own unit stops while warning is output to other indoor units.	Stop (Sub unit) (Automatic reset)	Displayed when error is detected	1. Judge sub unit while master unit is in [E03], [L03], [L07], [L08]. 2. Check indoor P.C. board.
◎	◎	●	F01	Coming-off, disconnection or short of indoor heat exchanger sensor (TCJ)	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor heat exchanger temperature sensor (TCJ). 2. Check indoor P.C. board.
◎	◎	●	F02	Coming-off, disconnection or short of indoor heat exchanger sensor (TC)	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor heat exchanger temperature sensor (TC). 2. Check indoor P.C. board.
◎	◎	●	F10	Coming-off, disconnection or short of indoor heat exchanger sensor (TA)	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor heat exchanger temperature sensor (TA). 2. Check indoor P.C. board.
◎	◎	●	F29	Indoor EEPROM error • EEPROM access error	Stop (Automatic reset)	Displayed when error is detected	1. Check indoor EEPROM. (including socket insertion) 2. Check indoor P.C. board.
◎	●	●	E10	Communication error between indoor MCU • Communication error between fan driving MCU and main MCU	Stop (Automatic reset)	Displayed when error is detected	1. Check cables of remote controller. 2. Check power cables of indoor unit. 3. Check indoor P.C. board.
◎	●	●	E18	Regular communication error between master and sub indoor units or between main and sub indoor units	Stop (Automatic reset)	Displayed when error is detected	1. Check cables of remote controller. 2. Check indoor power cable. 3. Check indoor P.C. board.

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Error mode detected by outdoor unit

◎ : Flash, ○ : Go on, ● : Go off

Wireless sensor lamp display			Wired remote controller	Diagnostic function			Judgment and measures
Operation	Timer	Ready	Check code	Cause of operation	Status of air conditioner	Condition	
●	◎	●	H01	Breakdown of compressor • Displayed when error is detected	Stop	Displayed when error is detected	1. Check power voltage. AC200V±20V 2. Overload operation of refrigerating cycle 3. Check current detection circuit at AC side.
●	◎	●	H02	Compressor does not rotate. • Over-current protective circuit operates after specified time passed when compressor had been activated.	Stop	Displayed when error is detected	1. Trouble of compressor (Compressor lock, etc.) : Replace compressor. 2. Defective cabling of compressor (Phase missing) 3. Phase-missing operation of power supply (3-phase model)
●	◎	●	H03	Current detection circuit error • Current value at AC side is high even during compressor-OFF. • Phase of power supply is missed.	Stop	Displayed when error is detected	1. Compressor immediately stops even if restarted. : Check IPDU. 2. Phase-missing operation of power supply Check 3-phase power voltage and cables.
◎	○	◎	L29	Outdoor unit and other errors • Communication error between CDB and IPDU (Coming-off of connector) • Heat sink temperature error (Detection of temperature over specified value)	Stop	Displayed when error is detected	1. Check cables of CDB and IPDU. 2. Abnormal overload operation of refrigerating cycle
◎	○	◎	L31	Phase detection protective circuit operates. (Normal models)	Operation continues. (Compressor stops.)	Displayed when error is detected	1. Check power phase order (Reversed phase)/phase missing. 2. Check outdoor P.C. board.
◎	●	◎	P03	Discharge temperature error • Discharge temperature over specified value was detected.	Stop	Displayed when error is detected	1. Check refrigerating cycle. (Gas leak) 2. Trouble of PMV 3. Check Td sensor.
◎	●	◎	P04	High-pressure protection error by TE sensor (Temperature over specified value was detected.)	Stop	Displayed when error is detected	1. Overload operation of refrigerating cycle 2. Check outdoor temperature sensor (TE). 3. Check outdoor CDB P.C. board.
◎	●	◎	P22	Outdoor DC fan error	Stop	Displayed when error is detected	1. Defective detection of position 2. Over-current protective circuit of outdoor fan driving unit operates. 3. Lock of outdoor fan 4. Check outdoor CDB P.C. board.
◎	●	◎	P26	Inverter over-current protective circuit operates. (For a short time) Short voltage of main circuit operates.	Stop	Displayed when error is detected	1. Inverter immediately stops even if restarted. : Compressor motor rare short 2. Check IPDU. : Cabling error
◎	●	◎	P29	IPDU position detection circuit error	Stop	Displayed when error is detected	1. Position detection circuit operates even if operating compressor by removing 3P connector. : Replace IPDU.
◎	◎	○	F04	Coming-off, disconnection or short of outdoor temperature sensor (TD)	Stop	Displayed when error is detected	1. Check outdoor temperature sensor (TD). 2. Check outdoor CDB P.C. board.
◎	◎	○	F06	Coming-off, disconnection or short of outdoor temperature sensor (TE/TS)	Stop	Displayed when error is detected	1. Check outdoor temperature sensor (TE/TS). 2. Check outdoor CDB P.C. board.
◎	◎	○	F08	Coming-off, disconnection or short of outdoor temperature sensor (TO)	Operation continues.	Displayed when error is detected	1. Check outdoor temperature sensor (TO). 2. Check outdoor CDB P.C. board.

For an error mode detected in outdoor unit, the fan operates because sub unit of a group operation does not communicate with the outdoor unit.

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Error mode detected by remote controller or network adapter

◎ : Flash, ○ : Go on, ● : Go off

Wireless sensor lamp display			Wired remote controller	Diagnostic function			Judgment and measures
Operation	Timer	Ready	Check code	Cause of operation	Status of air conditioner	Condition	
—	—	—	No check code is displayed. (Remote controller does not operate.)	No communication with master indoor unit • Remote controller cable is not correctly connected. • Power of indoor unit is not turned on. • Automatic address cannot be completed.	Stop	—	Remote controller power error, Defective indoor EEPROM 1. Check remote controller inter-unit cables. 2. Check remote controller. 3. Check indoor power cables. 4. Check indoor P.C. board. 5. Check indoor EEPROM. (including socket insertion) : Phenomenon of automatic address repetition occurred.
◎	●	●	E01*2	No communication with indoor master unit • Disconnection of inter-unit cable between remote controller and master indoor unit (Detected at remote controller side)	Stop (Automatic restart) * When there is center, operation continues.	Displayed when error is detected	Signal receiving of remote controller is defective. 1. Check remote controller inter-unit cables. 2. Check remote controller. 3. Check indoor power cables. 4. Check indoor P.C. board.
◎	●	●	E02	Signal sending error to indoor unit (Detected at remote controller side)	Stop (Automatic restart) * When there is center, operation continues.	Displayed when error is detected	Signal sending of remote controller is defective. 1. Check sending circuit inside of remote controller. : Replace remote controller.
◎	●	●	E09	Multiple master remote controllers are recognized. (Detected at remote controller side)	Stop (Sub unit continues operation.)	Displayed when error is detected	1. Check there are multiple master units for 2 remote controllers (including wireless). : Master unit is one and others are sub units.
◎	○	◎	L20 Central remote controller 98	Duplicated indoor central addresses on communication of central control system (AI-NET) (Detected by central controller side)	Stop (Automatic restart)	Displayed when error is detected	1. Check address setup of central control system network. (Network adapter SW01) 2. Check network adapter P.C. board.
—	—	—	— *3 Central remote controller 99	Multiple network adapters on remote controller communication line (Detected by central controller side)	Operation continues.	Displayed when error is detected	1. Check multiple network adapters. 2. Check inter-unit cable/miscabling of remote controller. : Only one network adapter on remote controller communication line
—	—	—	— *3 Central remote controller 97	Interruption of central control system (AI-NET) communication circuit (Detected by central controller side)	Operation continues. (According to handy remote controller)	Displayed when error is detected	1. Check communication line/miscabling. Check power of indoor unit. 2. Check communication. (XY terminals) 3. Check network adapter P.C. board. 4. Check central controller (such as central control remote controller, etc.).
—	—	—	— Central remote controller b7	Indoor Gr sub unit error (Detected by central controller side)	Continuation/stop (Based on a case)	Displayed when error is detected	Check the check code of corresponding unit by handy remote controller.

*2 Check code is not displayed by wired remote controller. (Usual operation of air conditioner is disabled.)
For wireless type models, E01 is notified by the display lamp.

*3 These errors are related to communication of remote controllers (A, B) and central system (AI-NET, X, Y), and [E01], [E02], [E03], [E09], or [E18] is displayed or no check code is displayed on the remote controller according to the error contents.

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10-3. Error Mode Detected by LED on Outdoor P.C. Board

<SW800: LED display in bit 1, bit 2, bit 3 OFF>

- When multiple errors are detected, the latest error is displayed.
- When LED display is ○ (Go on), there is the main cause of trouble on the objective part of control at CDB side and the unit stops.
- When LED display is ◎ (Flash), there is the main cause of trouble on the objective part of control at IPDU side and the unit stops.
- When case thermostat operates, the communication is interrupted on the serial circuit. If continuing the case thermostat operation, a serial communication error occurs because serial sending to the indoor unit is interrupted.

	No.	Item	Check code		LED display			
			Type A	Type B	D800 (Red)	D801 (Yellow)	D802 (Yellow)	D803 (Yellow)
CDB side	1	TE sensor error	F06	18	○	●	●	●
	2	TD sensor error	F04	19	○	○	●	●
	3	TS sensor error	F06	18	●	●	○	●
	4	TO sensor error	F08	1B	●	○	●	●
	5	Discharge temp. error	P03	1E	●	○	○	●
	6	DC outdoor fan error	P22	1A	○	○	○	●
	7	Communication error between IPDU (Abnormal stop)	L29	1C	○	●	●	○
	8	High-pressure release operation	P04	21	●	○	●	○
				—				
	9	EEPROM error	—	—	○	○	●	○
	10	Communication error between IPDU (No abnormal stop)	—	—	●	●	○	○
IPDU side	11	G-Tr short-circuit protection	P26	14	◎	●	●	●
	12	Detection circuit error	P29	16	●	◎	●	●
	13	Current sensor error	H03	17	◎	◎	●	●
	14	Phase missing detection	H03	17	●	●	●	◎
	15	Comp. lock error	H02	1D	●	●	◎	●
	16	Comp. breakdown	H01	1F	◎	●	◎	●

○ : Go on ● : Go off ◎ : Flash (5Hz)

<<Check code>>

The check codes are classified into Type A and Type B according to the used remote controller. Be sure to check the remote controller which you use.

Type A :
Neutral 2-cores type wired remote controller such as RBC-AMT21E, RBC-AS21E, and wireless remote controller kit such as TCB-AX21U (W)-E

Type B :
Polarized 3-cores type wired remote controller such as RBC-SR1-PE, RBC-SR2-PE, and central control remote controller such as RBC-CR64-PE

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SP560AT-E, RAV-SP800AT-E (A03-014)

<SW800: LED display in bit 1, bit 2, bit 3, bit 4 OFF>

- When multiple errors are detected, the latest error is displayed.
- While LED displays ○ (go on), there is the main cause of error in control at CDB side and it stops abnormally.
- While LED displays ◎ (flash), there is the main cause of error in control at IPDU side and it stops abnormally.
- For an error in case thermo operation, the communication is interrupted on the serial circuit. If continuing the case thermo operation, serial sending to the indoor unit is interrupted and a serial communication error is output.

	No.	Item	Check code	LED display			
			B type	D800 (Red)	D801 (Yellow)	D802 (Yellow)	D803 (Yellow)
CDB side	1	TE sensor error	18	○	●	●	●
	2	TD sensor error	19	○	○	●	●
	3	TS sensor error	18	●	●	○	●
	4	TO sensor error	1B	●	○	●	●
	5	Discharge temp error	1E	●	○	○	●
	6	Out DC fan error	1A	○	○	○	●
	7	Communication error between IPDU (Abnormal stop)	1C	○	●	●	○
	8	High-pressure release operation	21	●	○	●	○
			—				
	9	EEPROM error	—	○	○	●	○
	10	Communication error between IPDU (No abnormal stop)	—	●	●	○	○
IPDU side	11	G-Tr short-circuit protection	14	◎	●	●	●
	12	Detection circuit error	16	●	◎	●	●
	13	Current sensor error	17	◎	◎	●	●
	14	Phase missing detection	17	●	●	●	◎
	15	Comp lock error	1D	●	●	◎	●
	16	Comp breakdown	1F	◎	●	◎	●

○ : Go on ● : Go off ◎ : Flash (5Hz)

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RAV-SP1100AT-E, RAV-SP1400AT-E

<SW800: LED display in bit 1, bit 2, bit 3 OFF>

- When multiple errors are detected, the latest error is displayed.
- When LED display is ○ (Go on), there is the main cause of trouble on the objective part of control at CDB side and the unit stops.
- When LED display is ◎ (Flash), there is the main cause of trouble on the objective part of control at IPDU side and the unit stops.
- When case thermostat operates, the communication is interrupted on the serial circuit. If continuing the case thermostat operation, a serial communication error occurs because serial sending to the indoor unit is interrupted.

	No.	Item	Check code		LED display			
			Type A	Type B	D800 (Red)	D801 (Yellow)	D802 (Yellow)	D803 (Yellow)
CDB side	1	TE sensor error	F06	18	○	●	●	●
	2	TD sensor error	F04	19	○	○	●	●
	3	TS sensor error	F06	18	●	●	○	●
	4	TO sensor error	F08	1B	●	○	●	●
	5	Discharge temp. error	P03	1E	●	○	○	●
	6	DC outdoor fan error	P22	1A	○	○	○	●
	7	Communication error between IPDU (Abnormal stop)	L29	1C	○	●	●	○
	8	High-pressure release operation	P04	21	●	○	●	○
				—				
	9	EEPROM error	—	—	○	○	●	○
	10	Communication error between IPDU (No abnormal stop)	—	—	●	●	○	○
IPDU side	11	G-Tr short-circuit protection	P26	14	◎	●	●	●
	12	Detection circuit error	P29	16	●	◎	●	●
	13	Current sensor error	H03	17	◎	◎	●	●
	14	Phase missing detection	H03	17	●	●	●	◎
	15	Comp. lock error	H02	1D	●	●	◎	●
	16	Comp. breakdown	H01	1F	◎	●	◎	●

○ : Go on ● : Go off ◎ : Flash (5Hz)

<<Check code>>

The check codes are classified into Type A according to the used remote controller.
Be sure to check the remote controller which you use.

Type A :
Neutral 2-cores type wired remote controller such as RBC-AMT21E and RBC-AS21E.

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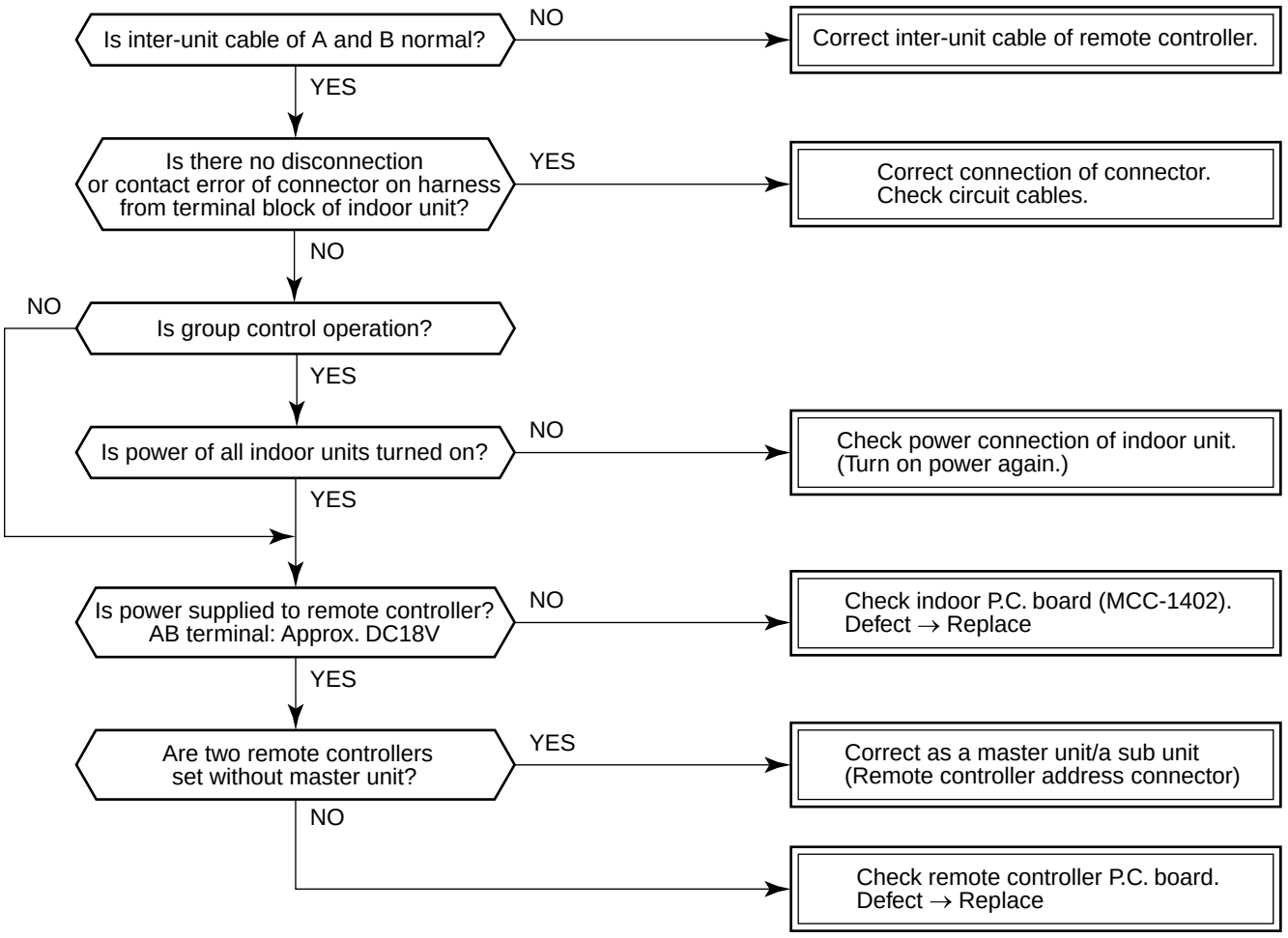
10-4. Troubleshooting Procedure for Each Check Code (A02-014)

10-4-1. New Check Code/Present Check Code (Central Control Side)

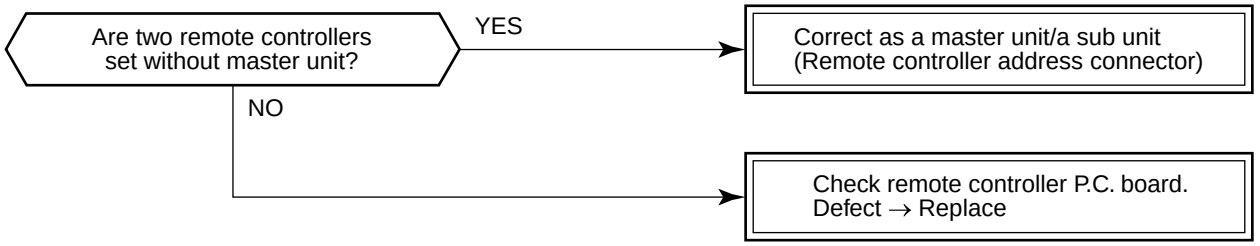
[E01 error]/*[99 error]

***** : When central controller **[99]** is displayed, there are other causes of error.


Is inter-unit cable of A and B normal?
NO
Correct inter-unit cable of remote controller.
YES
Is there no disconnection or contact error of connector on harness from terminal block of indoor unit?
YES
Correct connection of connector. Check circuit cables.
NO
NO
Is group control operation?
YES
Is power of all indoor units turned on?
NO
Check power connection of indoor unit. (Turn on power again.)
YES
Is power supplied to remote controller? AB terminal: Approx. DC18V
NO
Check indoor P.C. board (MCC-1402). Defect → Replace
YES
Are two remote controllers set without master unit?
YES
Correct as a master unit/a sub unit (Remote controller address connector)
NO
Check remote controller P.C. board. Defect → Replace

[E09 error]/*[99 error]

***** : When central controller **[99]** is displayed, there are other causes of error.


Are two remote controllers set without master unit?
YES
Correct as a master unit/a sub unit (Remote controller address connector)
NO
Check remote controller P.C. board. Defect → Replace

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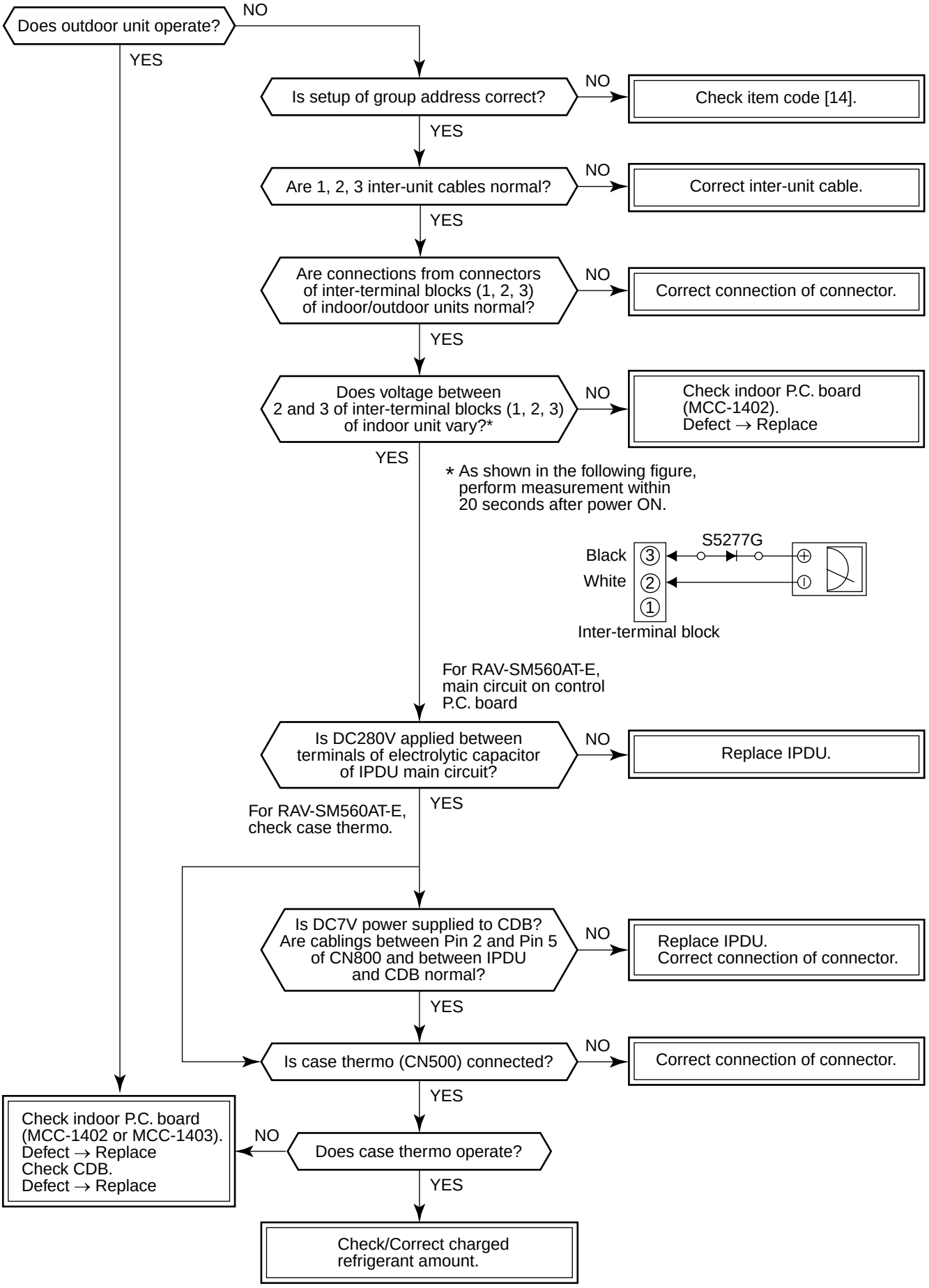
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

[E04 error]/[04 error]


Does outdoor unit operate?
NO
YES
Is setup of group address correct?
NO
Check item code [14].
YES
Are 1, 2, 3 inter-unit cables normal?
NO
Correct inter-unit cable.
YES
Are connections from connectors of inter-terminal blocks (1, 2, 3) of indoor/outdoor units normal?
NO
Correct connection of connector.
YES
Does voltage between 2 and 3 of inter-terminal blocks (1, 2, 3) of indoor unit vary?*
NO
Check indoor P.C. board (MCC-1402). Defect → Replace
YES
* As shown in the following figure, perform measurement within 20 seconds after power ON.
S5277G
Black
White
③
②
①
Inter-terminal block
For RAV-SM560AT-E, main circuit on control P.C. board
Is DC280V applied between terminals of electrolytic capacitor of IPDU main circuit?
NO
Replace IPDU.
YES
For RAV-SM560AT-E, check case thermo.
Is DC7V power supplied to CDB? Are cablings between Pin 2 and Pin 5 of CN800 and between IPDU and CDB normal?
NO
Replace IPDU. Correct connection of connector.
YES
Is case thermo (CN500) connected?
NO
Correct connection of connector.
YES
Check indoor P.C. board (MCC-1402 or MCC-1403). Defect → Replace Check CDB. Defect → Replace
NO
Does case thermo operate?
YES
Check/Correct charged refrigerant amount.

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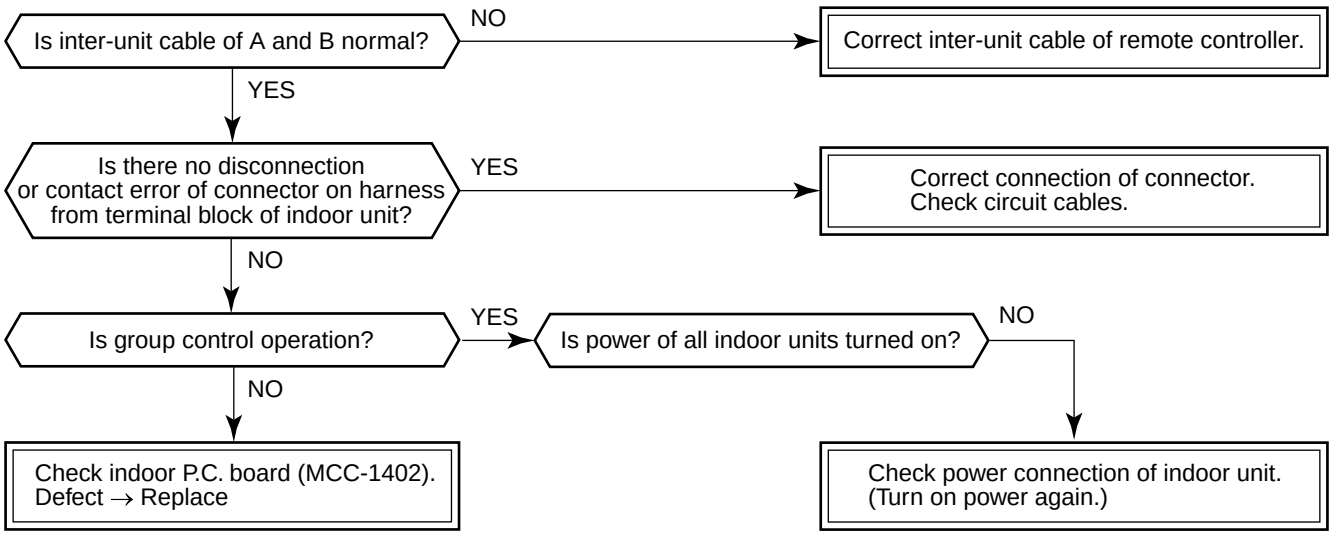
[E10 error]/[CF error]

Check indoor control P.C. board (MCC-1402).
Defect → Replace

[E18 error]/[97 error] *[99 error]

***** : When central controller **[99]** is displayed, there are other causes of trouble.


Is inter-unit cable of A and B normal?
NO
Correct inter-unit cable of remote controller.
YES
Is there no disconnection or contact error of connector on harness from terminal block of indoor unit?
YES
Correct connection of connector. Check circuit cables.
NO
Is group control operation?
YES
Is power of all indoor units turned on?
NO
NO
Check indoor P.C. board (MCC-1402). Defect → Replace
Check power connection of indoor unit. (Turn on power again.)

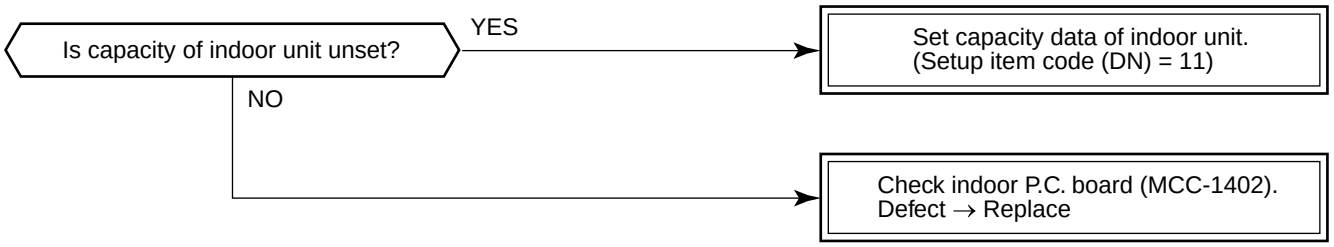
[E08, L03, L07, L08 error]/ *[96 error] [99 error]

***** : When central controller **[99]** is displayed, there are other causes of trouble.

E08 : Duplicated indoor unit numbers
L03 : Two or more master units in a group control
L07 : One or more group addresses of [Individual] in a group control
L08 : Unset indoor group address (99)

If the above is detected when power has been turned on, the mode automatically enters in automatic address setup mode. (Check code is not displayed.)
However, if the above is detected during automatic address setup mode, the check code may be displayed.

[L09 error]/[46 error]


Is capacity of indoor unit unset?
YES
Set capacity data of indoor unit. (Setup item code (DN) = 11)
NO
Check indoor P.C. board (MCC-1402). Defect → Replace

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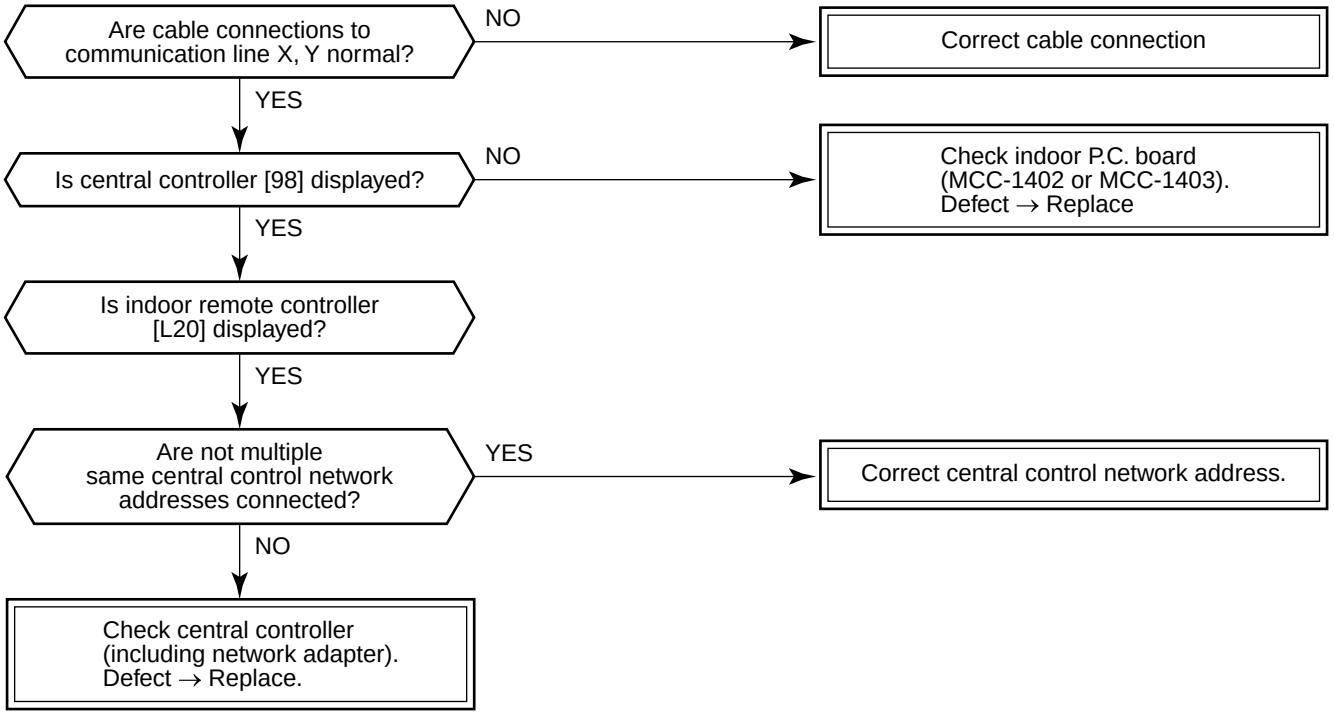
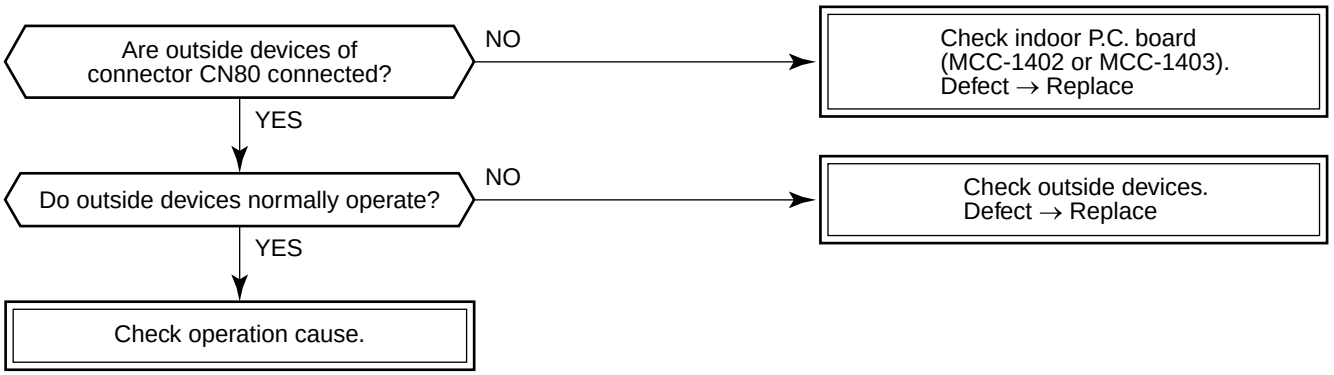
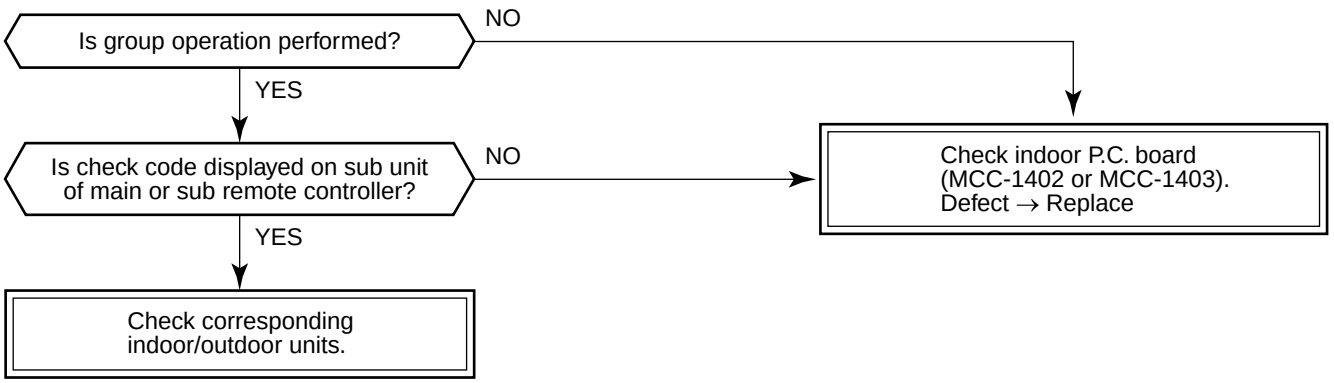
[L20 error]/[98 error]


Are cable connections to communication line X, Y normal?
NO
Correct cable connection
YES
Is central controller [98] displayed?
NO
Check indoor P.C. board (MCC-1402 or MCC-1403). Defect → Replace
YES
Is indoor remote controller [L20] displayed?
YES
Are not multiple same central control network addresses connected?
YES
Correct central control network address.
NO
Check central controller (including network adapter). Defect → Replace.

[L30 error]/[B6 error]



[b7 error] (Central controller)


Is group operation performed?
NO
YES
Is check code displayed on sub unit of main or sub remote controller?
NO
Check indoor P.C. board (MCC-1402 or MCC-1403). Defect → Replace
YES
Check corresponding indoor/outdoor units.

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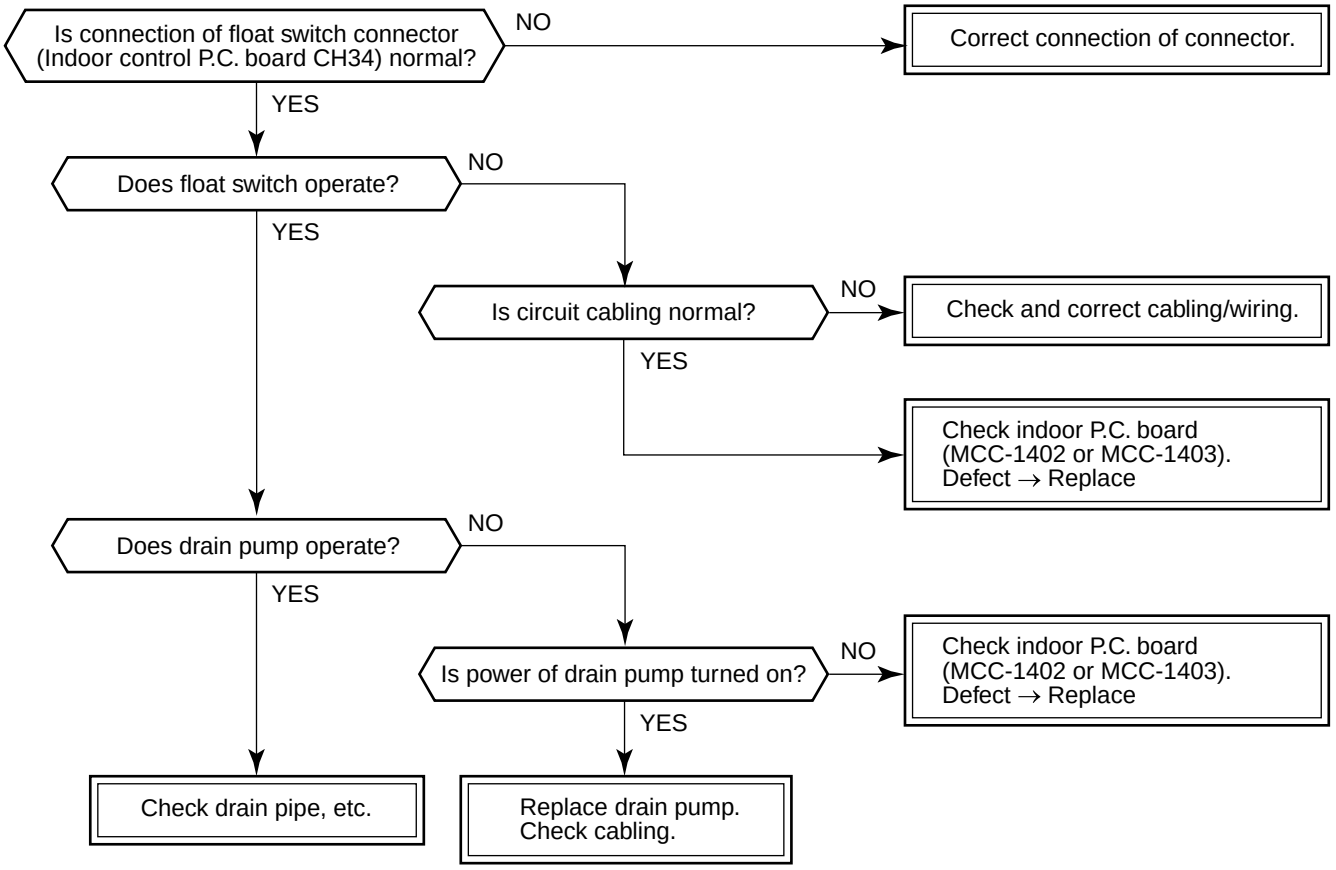
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

[P10 error]/[Ob error]



[F10 error] [0C error]

Is connection of TA sensor connector (indoor P.C. board CN104) normal?
NO
Correct connection of connector.
YES
Are characteristics of TA sensor resistance value normal?
NO
Replace TA sensor.
YES
* Refer to Characteristics-1.
Check indoor P.C. board (MCC-1402 or MCC-1403). Defect → Replace

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

[P12 error]/[11 error]

<Only for 4-way air discharge cassette type models>

Turn off the power.

Are not there connections errors or disconnection on connectors CN333 and CN334 of indoor unit P.C. board (MCC-1402)?

YES → Correct connection of connector.

NO

Remove connectors CN333 and CN334 of indoor unit P.C. board (MCC-1402).

Does the fan rotate without trouble when handling the fan with hands?

NO → Replace indoor fan motor.

YES

Are resistance values between phases at fan motor connector CN333 motor side of indoor P.C. board (MCC-1402) correct? *1

NO → Replace indoor fan motor.

YES

*1
- Are not coil windings between ① (Red lead) and ③ (White lead), between ③ (White lead) and ⑤ (Black lead), between ⑤ (Black lead) and ① (Red lead) opened or shorted?
  → For resistance, see the following values.
  RAV-SM560, SM800, SM1100, SM561, SM801, SM1101, SP560, SP800, SP1100 → Approx. 70 to 100Ω
  RAV-SM1400, SM1401, SP1400 → Approx. 35 to 50Ω
- Is not earthed between cabinet and 1, 3, 5 → 10MΩ or more

Is resistance value of fan motor connector CN333 at motor side of indoor P.C. board (MCC-1402) correct? *2

NO → Replace indoor fan motor.

YES

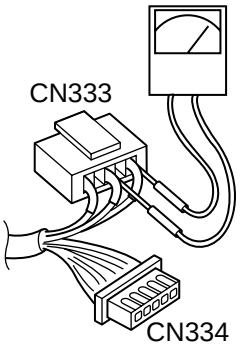
*2
Check resistance of fan motor position detection circuit.
Is not coil winding between ① (Yellow lead) and ④ (Pink lead) opened or shorted? → Resistance: Approx. 5 to 20kΩ

Is signal output of indoor fan motor position detection correct? *3

NO → Replace indoor fan motor.

YES

*3
Check fan motor position detection signal.
- Using a tester, measure the voltage between CN334 ① and ⑤ of indoor P.C. board (MCC-1402) under condition that CN333 and CN334 are mounted and the power is turned on.
  → Rotate the fan slowly with hands, and check the pin voltage swings between 0 to 5V voltage.
- Between ④ and ⑤ : 5V



Check indoor P.C. board (MCC-1402).
Defect → Replace

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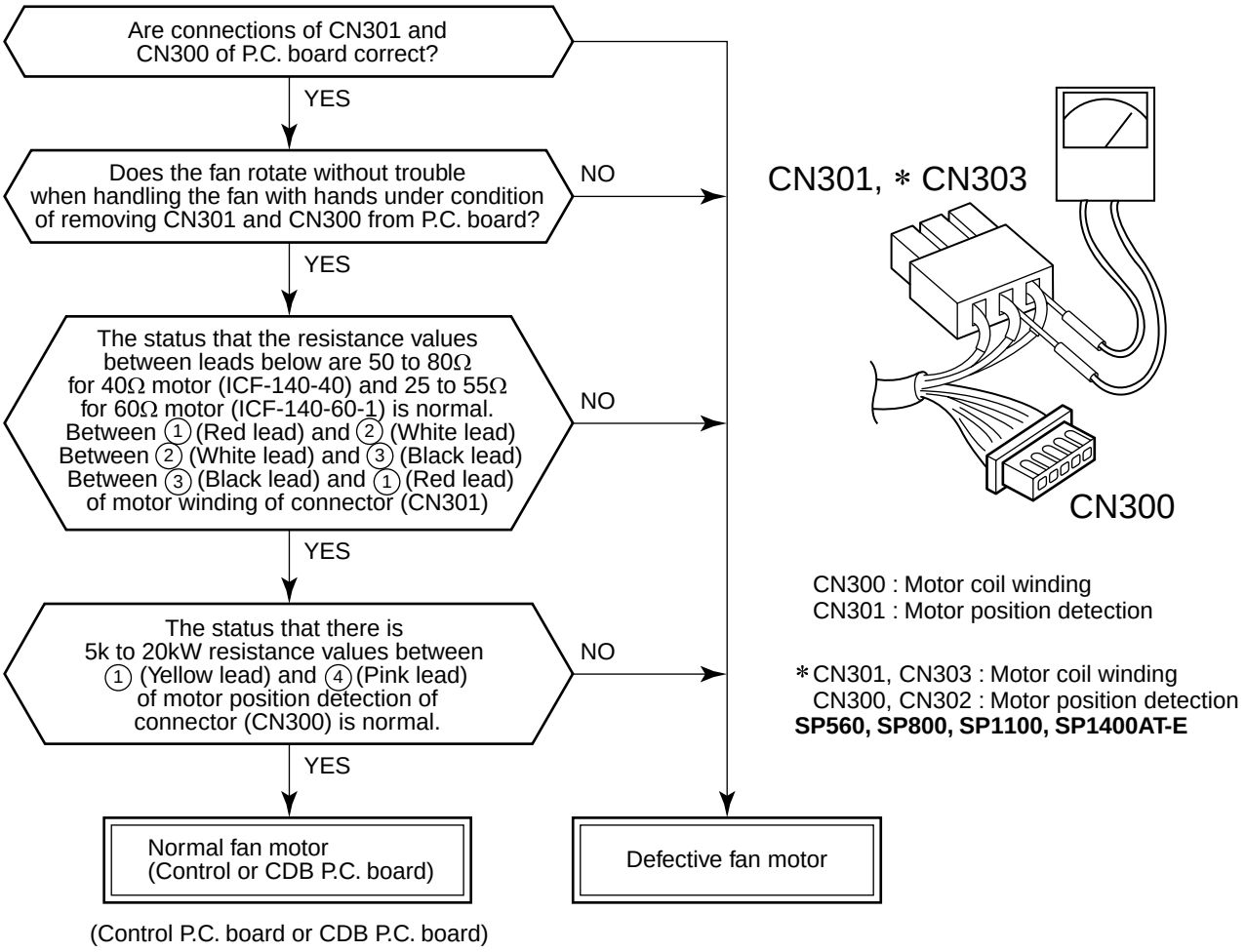
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

[P22 error]/[1A error]


Are connections of CN301 and CN300 of P.C. board correct?
YES
NO
Does the fan rotate without trouble when handling the fan with hands under condition of removing CN301 and CN300 from P.C. board?
YES
NO
The status that the resistance values between leads below are 50 to 80Ω for 40Ω motor (ICF-140-40) and 25 to 55Ω for 60Ω motor (ICF-140-60-1) is normal.
Between ① (Red lead) and ② (White lead)
Between ② (White lead) and ③ (Black lead)
Between ③ (Black lead) and ① (Red lead)
of motor winding of connector (CN301)
YES
NO
The status that there is 5k to 20kW resistance values between ① (Yellow lead) and ④ (Pink lead) of motor position detection of connector (CN300) is normal.
YES
NO
Normal fan motor (Control or CDB P.C. board)
Defective fan motor
CN301, * CN303
CN300

(Control P.C. board or CDB P.C. board)

CN300 : Motor coil winding
CN301 : Motor position detection

* CN301, CN303 : Motor coil winding
CN300, CN302 : Motor position detection
SP560, SP800, SP1100, SP1400AT-E

NOTE :
However, GND circuit error inside of the motor is rarely detected even if the above check is carried out.
When the circuit does not become normal even if P.C. board has been replaced, replace outdoor fan motor.

	Single phase	**Single phase**	**Single phase**
	RAV-SM560AT-E	**RAV-SM800AT-E RAV-SP560AT-E, SP800AT-E**	**RAV-SM1100AT-E, SM1400AT-E RAV-SP1100AT-E, SP1400AT-E**
Objective P.C. board	Control P.C. board	CDB P.C. board	CDB P.C. board
Fan motor winding	CN300	CN301	CN301
Motor position detection	CN301	CN300	CN300
Fan motor winding	——	——	CN303
Motor position detection	——	——	CN302

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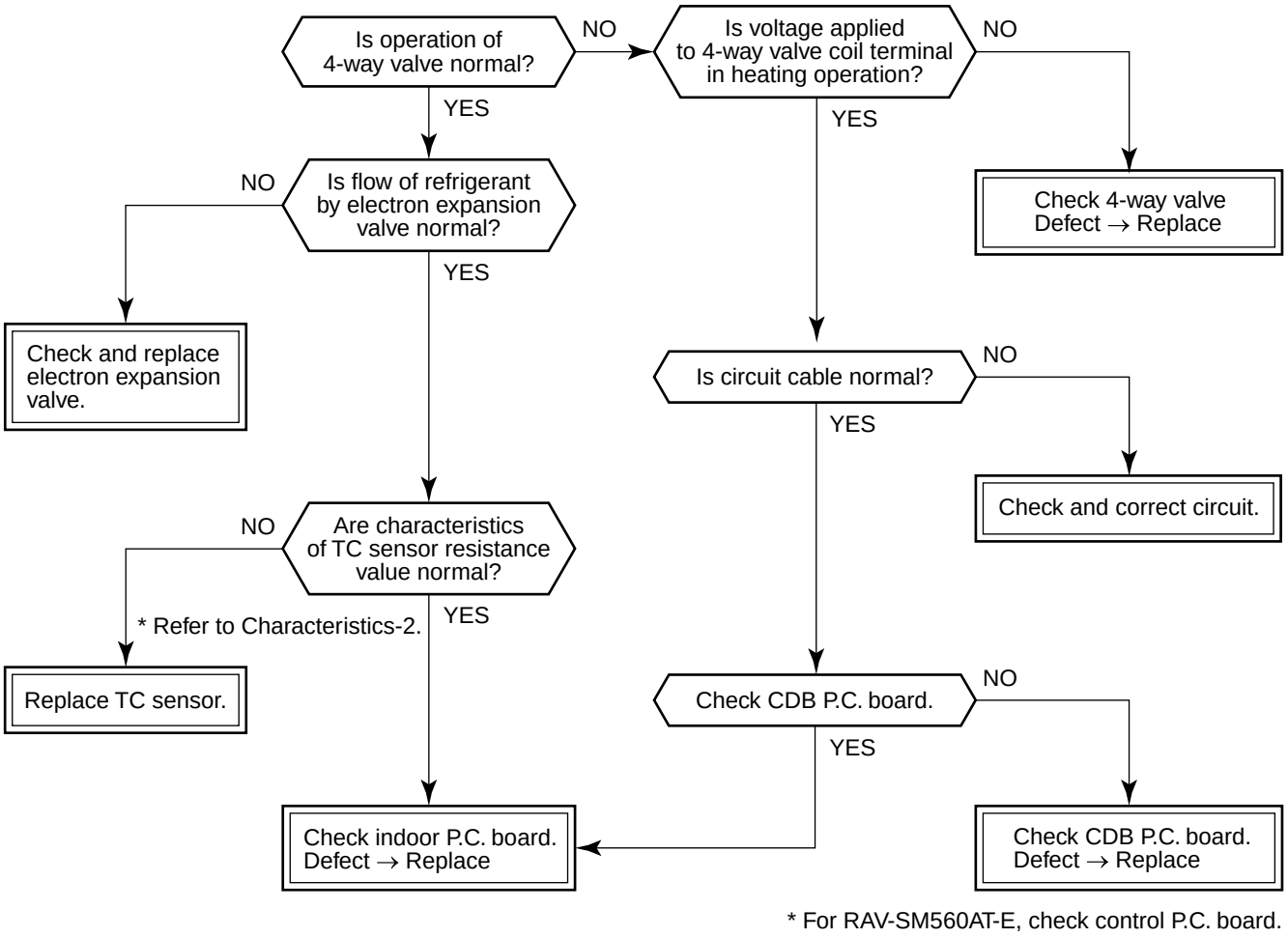
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

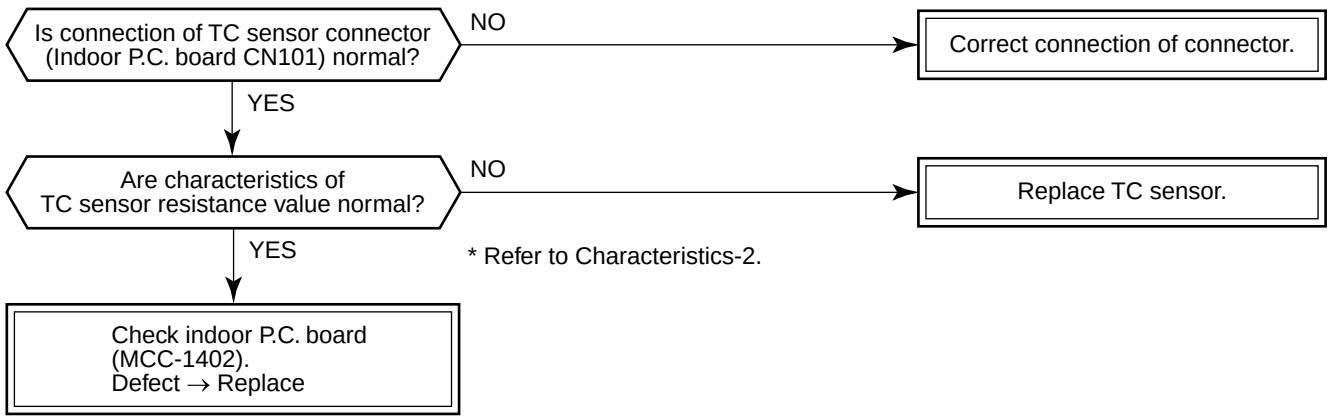
[P19 error]/[08 error]



* For RAV-SM560AT-E, check control P.C. board.

- In cooling operation, if high pressure is abnormally raised, [P19 error]/[08 error] may be displayed. In this case, remove cause of pressure up and then check again referring to the item [P04 error]/[21 error].

[F02 error]/[0d error]


Is connection of TC sensor connector (Indoor P.C. board CN101) normal?
NO
Correct connection of connector.
YES
Are characteristics of TC sensor resistance value normal?
NO
Replace TC sensor.
YES
* Refer to Characteristics-2.
Check indoor P.C. board (MCC-1402). Defect → Replace

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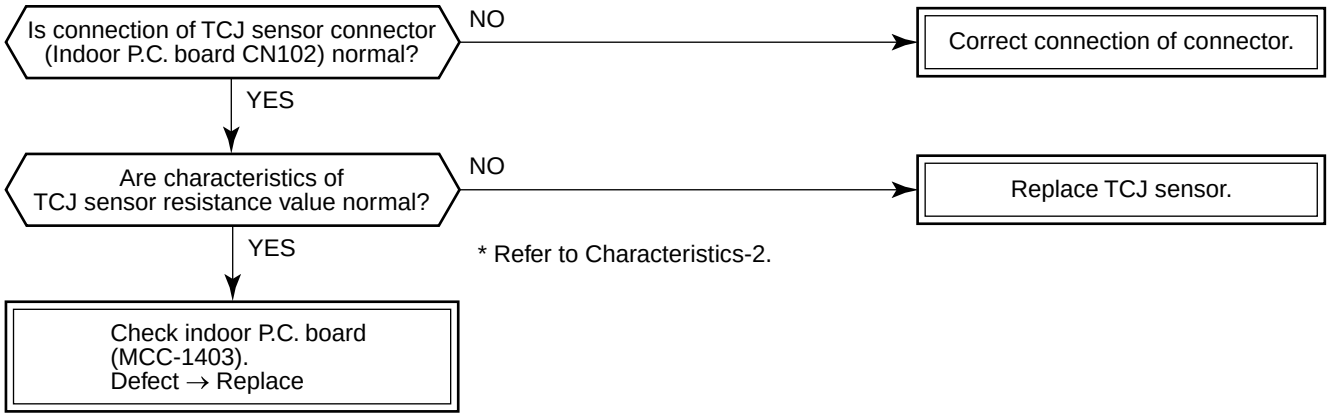
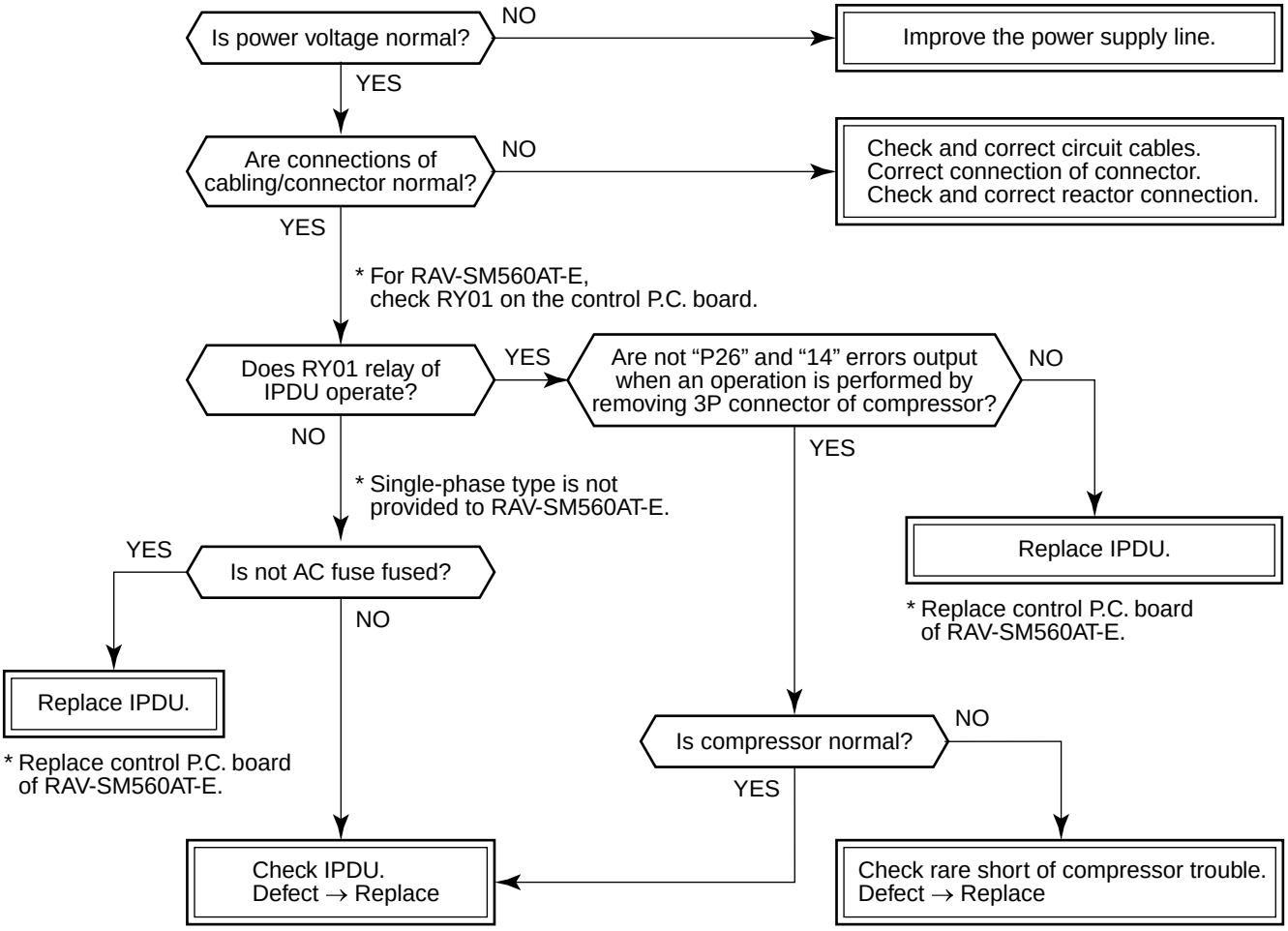
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

[F01 error]/[0F error]


Is connection of TCJ sensor connector (Indoor P.C. board CN102) normal?
NO
Correct connection of connector.
YES
Are characteristics of TCJ sensor resistance value normal?
NO
Replace TCJ sensor.
YES
* Refer to Characteristics-2.
Check indoor P.C. board (MCC-1403). Defect → Replace

[P26 error]/[14 error]


Is power voltage normal?
NO
Improve the power supply line.
YES
Are connections of cabling/connector normal?
NO
Check and correct circuit cables. Correct connection of connector. Check and correct reactor connection.
YES
* For RAV-SM560AT-E, check RY01 on the control P.C. board.
Does RY01 relay of IPDU operate?
YES
Are not “P26” and “14” errors output when an operation is performed by removing 3P connector of compressor?
NO
YES
NO
* Single-phase type is not provided to RAV-SM560AT-E.
Replace IPDU.
* Replace control P.C. board of RAV-SM560AT-E.
YES
Is not AC fuse fused?
NO
Replace IPDU.
* Replace control P.C. board of RAV-SM560AT-E.
Is compressor normal?
NO
YES
Check IPDU. Defect → Replace
Check rare short of compressor trouble. Defect → Replace

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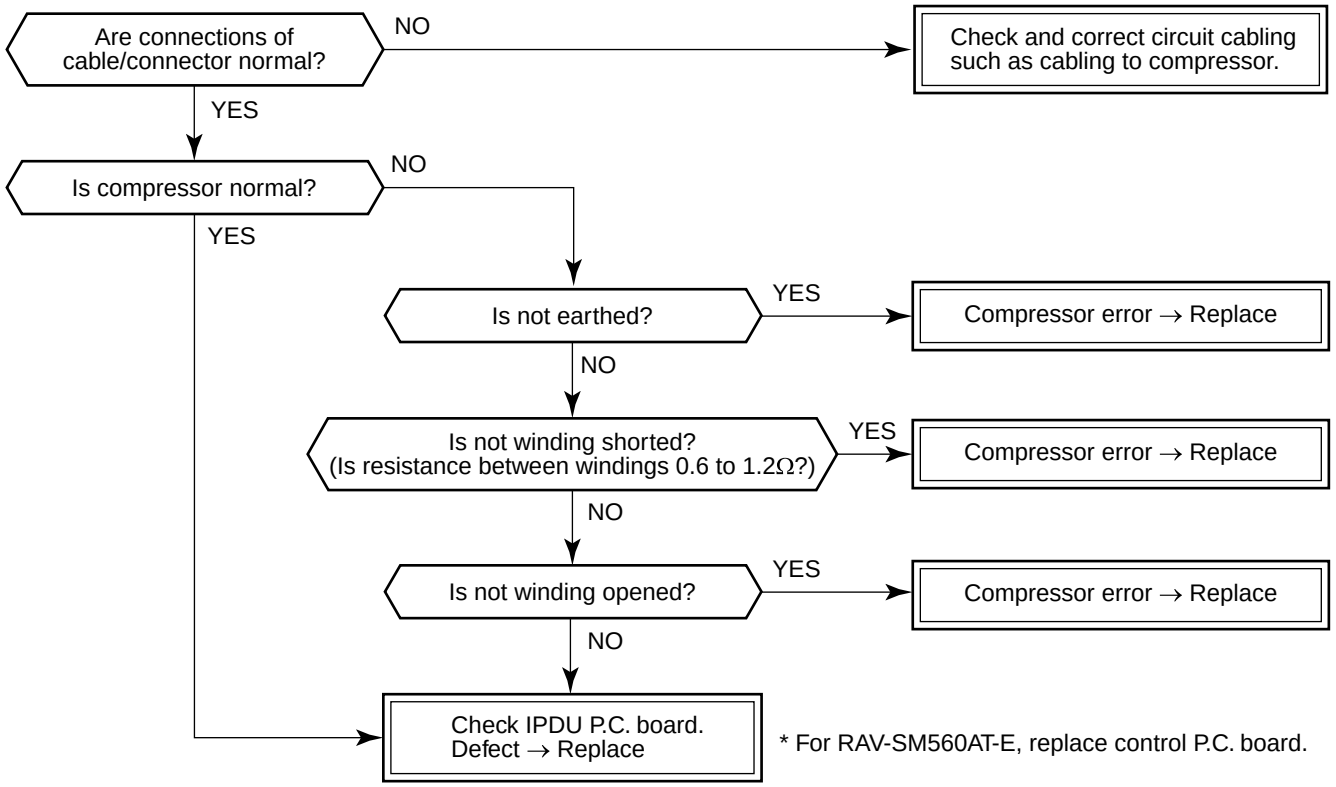
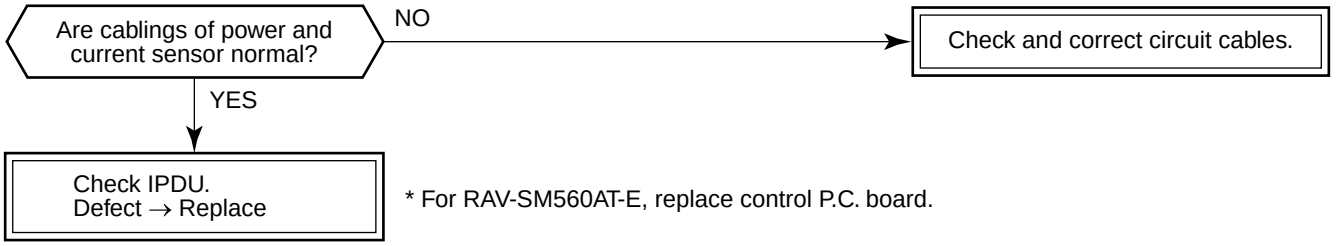
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

[P29 error]/[16 error]



[H03 error]/[17 error]


Are cablings of power and current sensor normal?
NO
Check and correct circuit cables.
YES
Check IPDU. Defect → Replace
* For RAV-SM560AT-E, replace control P.C. board.

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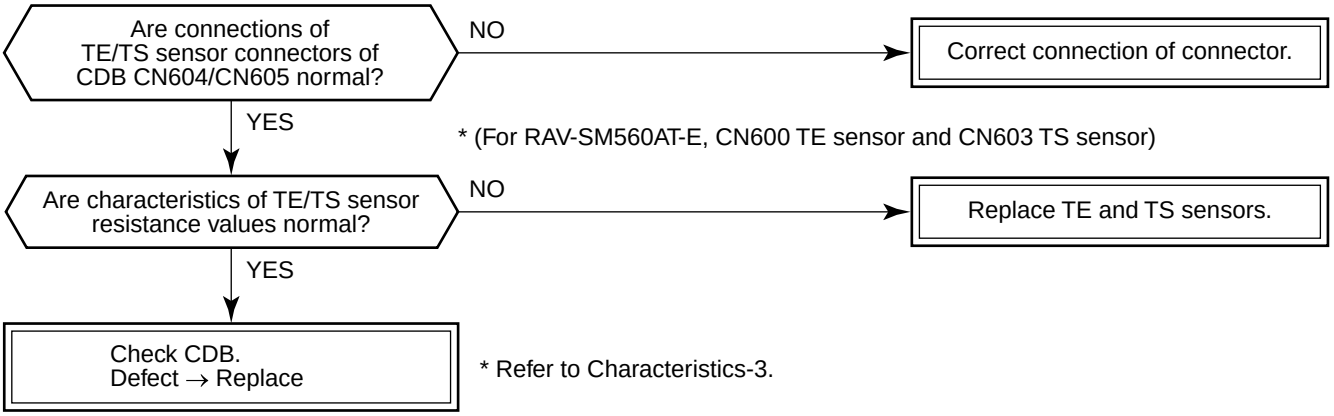
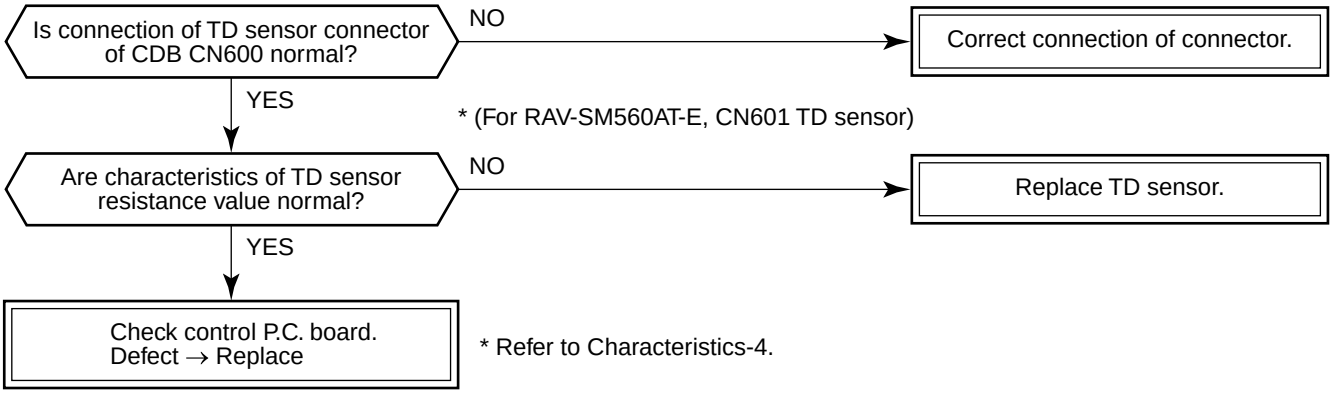
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

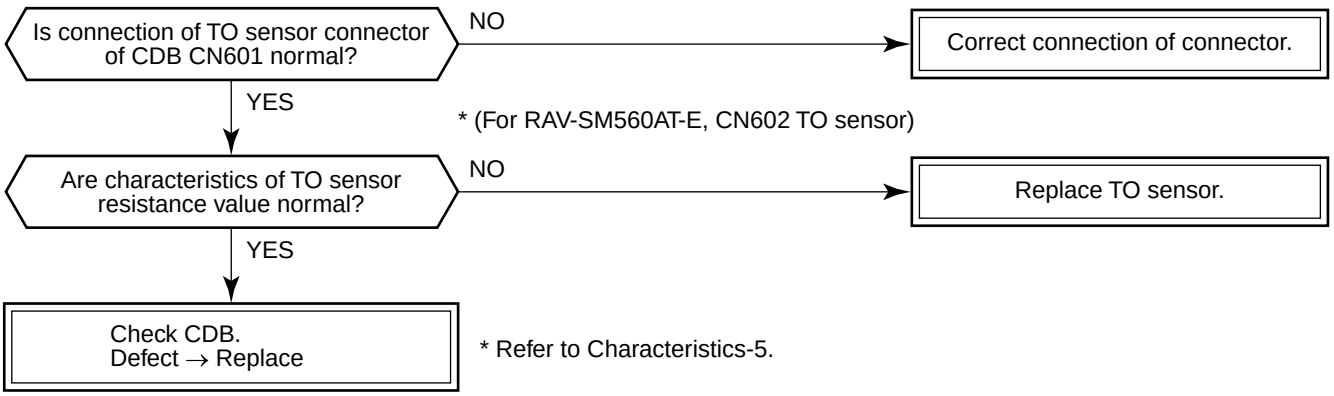
[F06 error]/[18 error]


Are connections of TE/TS sensor connectors of CDB CN604/CN605 normal?
NO
Correct connection of connector.
YES
* (For RAV-SM560AT-E, CN600 TE sensor and CN603 TS sensor)
Are characteristics of TE/TS sensor resistance values normal?
NO
Replace TE and TS sensors.
YES
Check CDB.
Defect → Replace
* Refer to Characteristics-3.

[F04 error]/[19 error]



[F08 error]/[1b error]



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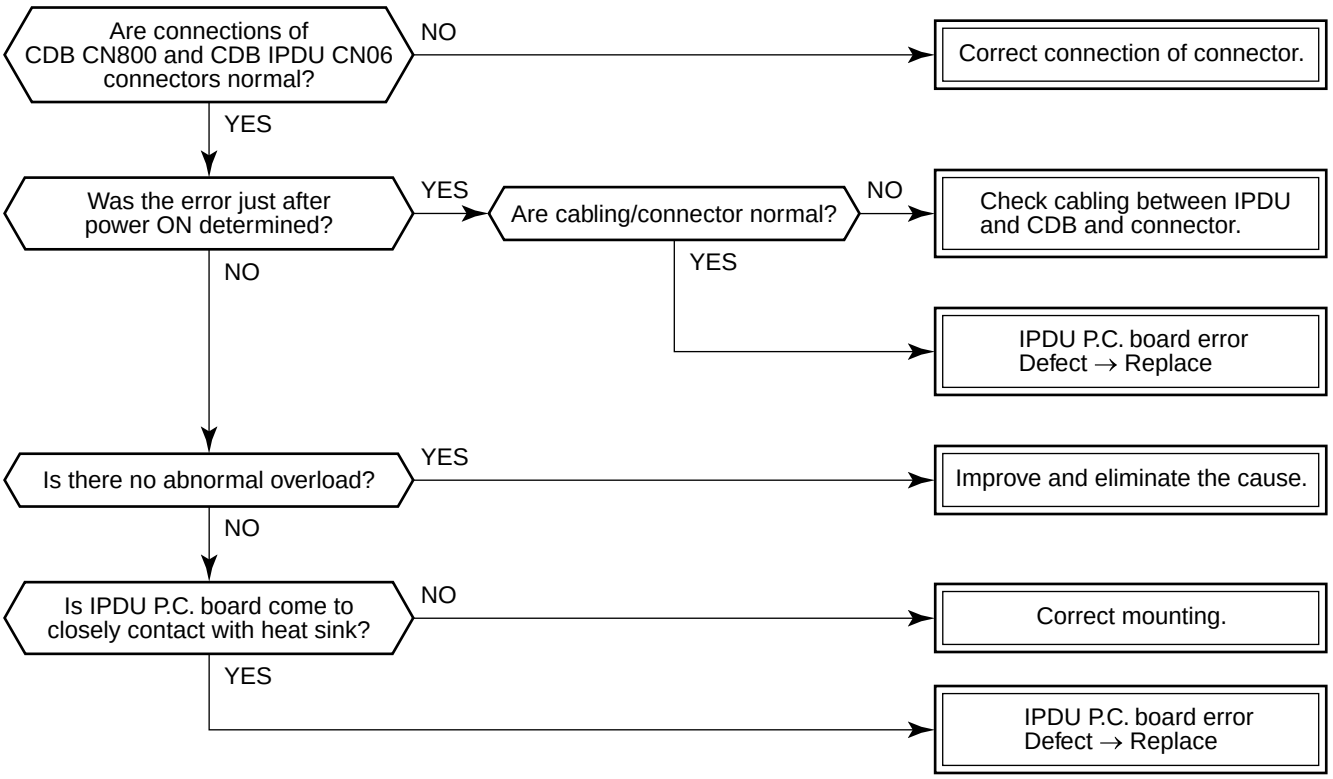
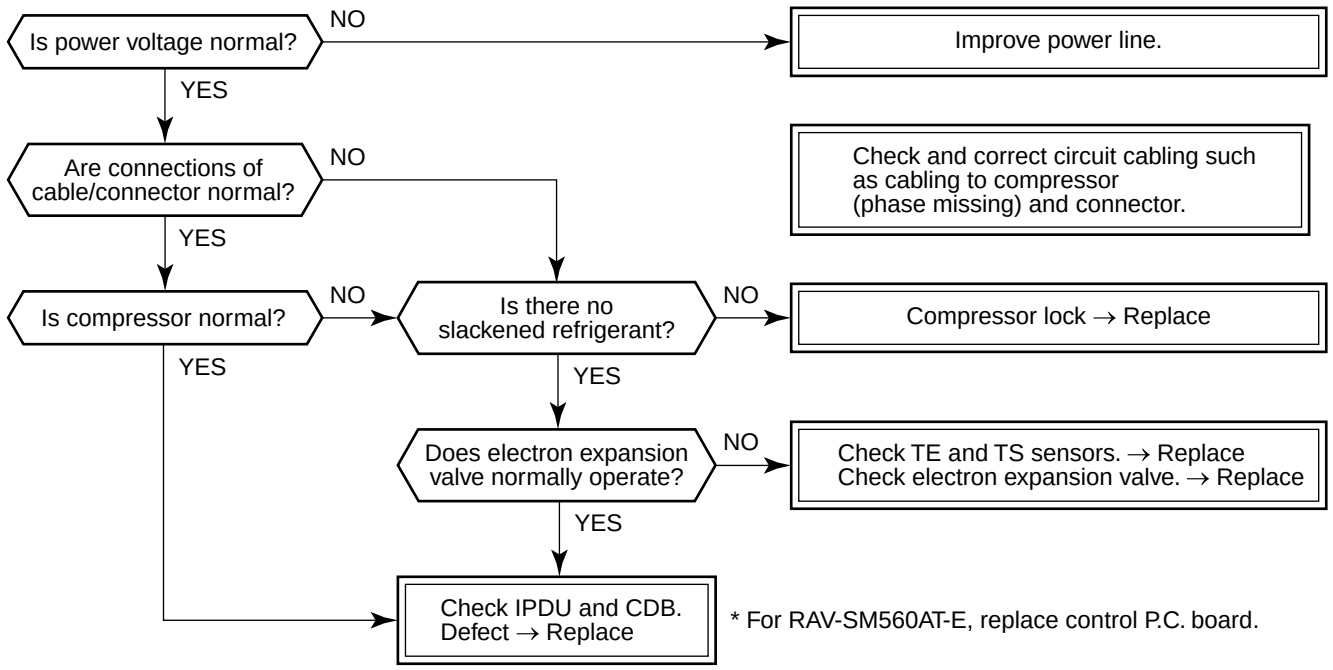
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

[L29 error]/[1C error]



[H02 error]/[1d error]



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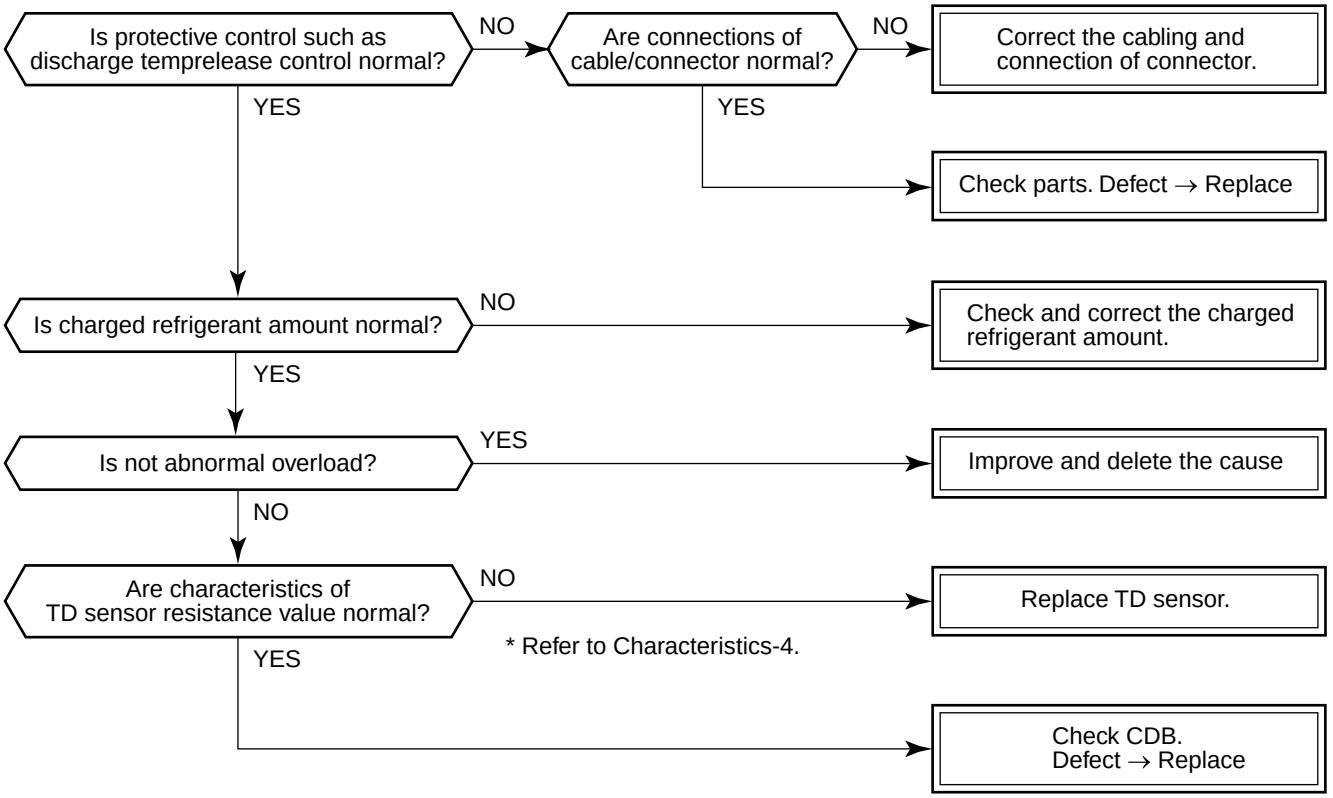
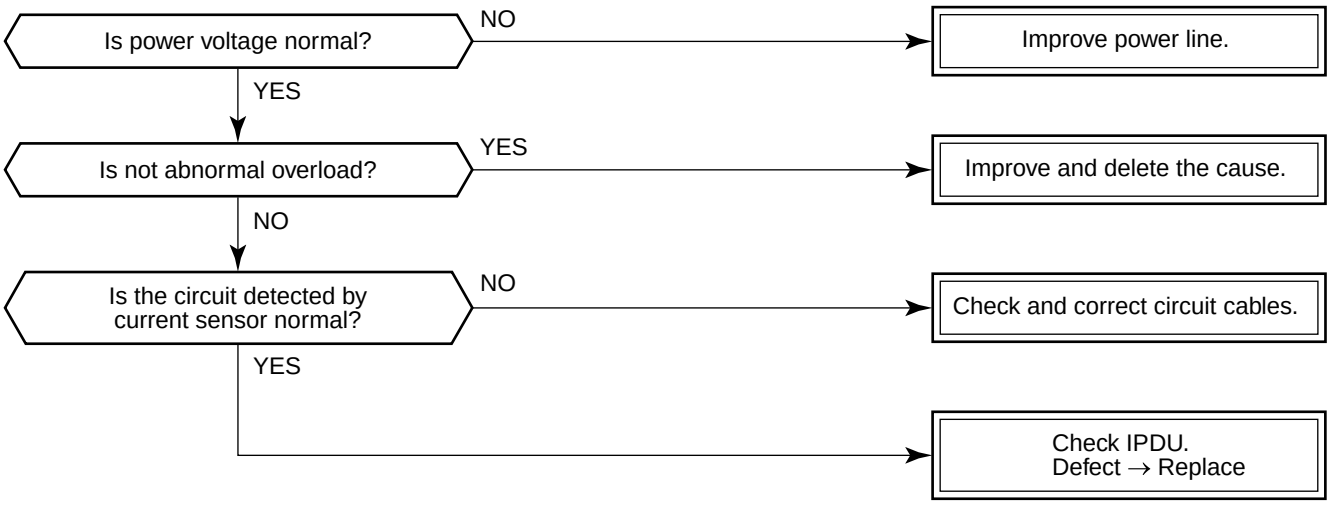
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

[P03 error]/[1E error]



* For RAV-SM560AT-E, replace control P.C. board.

[H01 error]/[1F error]



* For RAV-SM560AT-E, replace control P.C. board.

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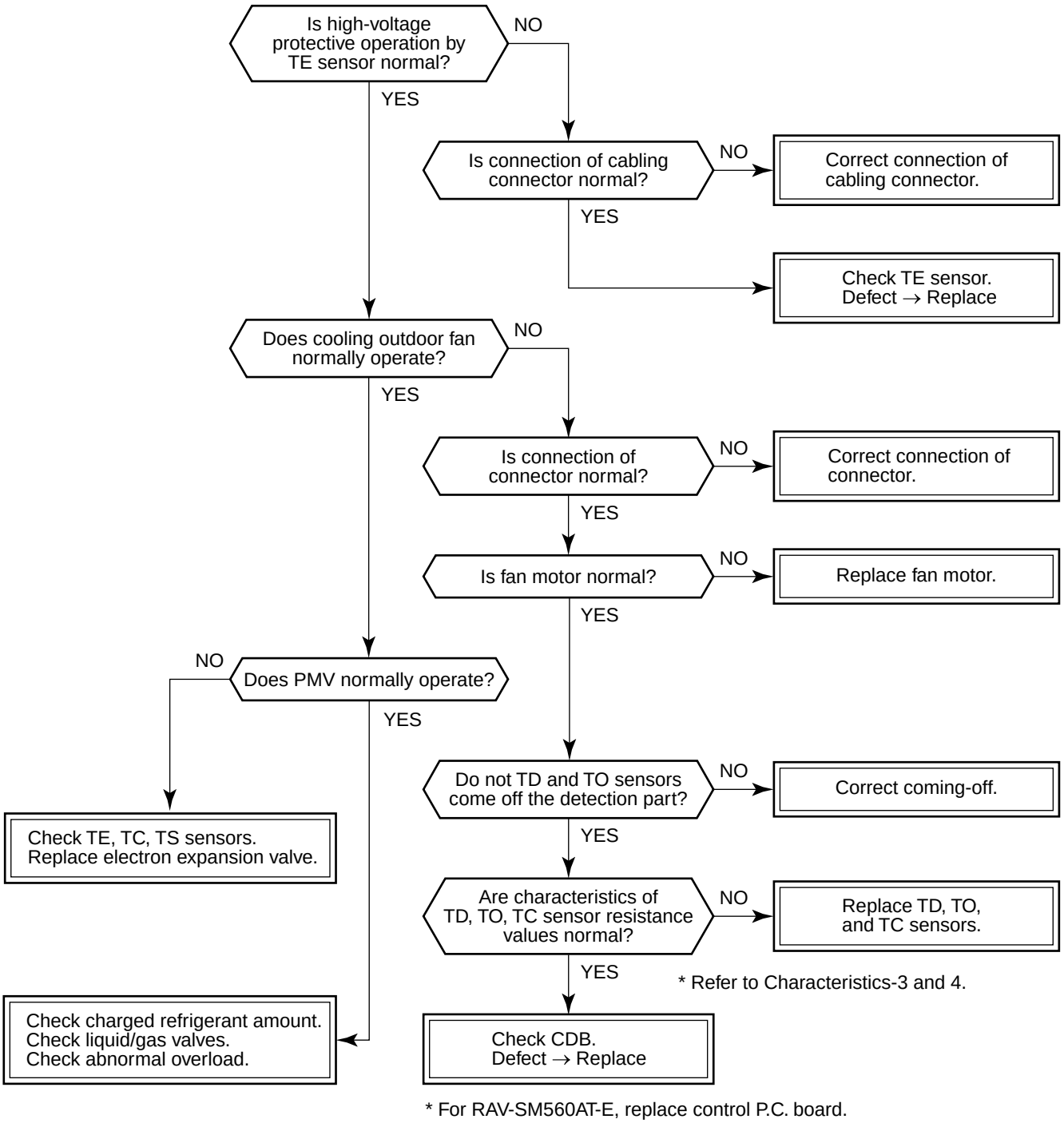
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

[P04 error]/[21 error]



* For RAV-SM560AT-E, replace control P.C. board.

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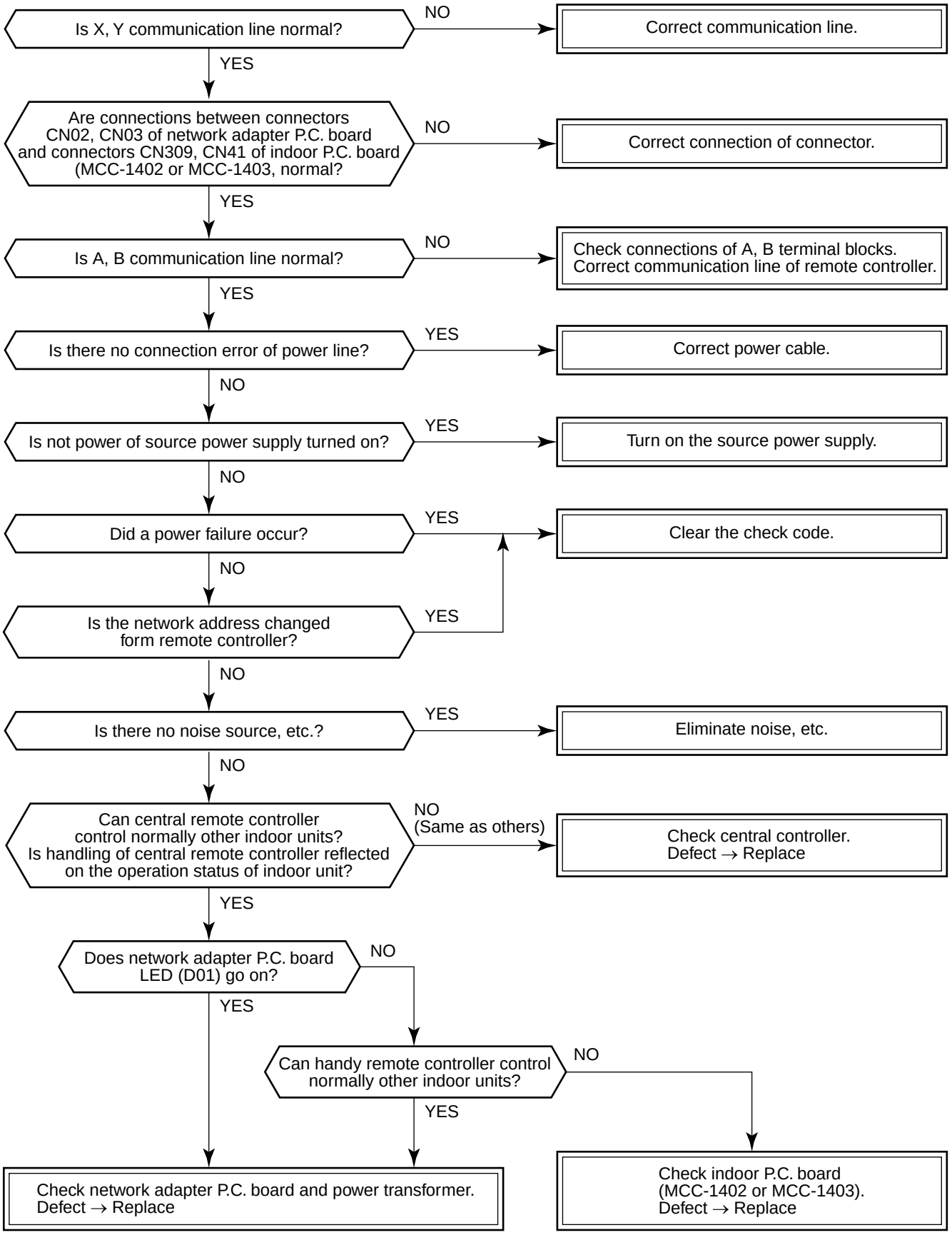
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

[97 error] (Central controller)


Is X, Y communication line normal?
NO
Correct communication line.
YES
Are connections between connectors CN02, CN03 of network adapter P.C. board and connectors CN309, CN41 of indoor P.C. board (MCC-1402 or MCC-1403, normal?
NO
Correct connection of connector.
YES
Is A, B communication line normal?
NO
Check connections of A, B terminal blocks. Correct communication line of remote controller.
YES
Is there no connection error of power line?
YES
Correct power cable.
NO
Is not power of source power supply turned on?
YES
Turn on the source power supply.
NO
Did a power failure occur?
YES
Clear the check code.
NO
Is the network address changed form remote controller?
YES
NO
Is there no noise source, etc.?
YES
Eliminate noise, etc.
NO
Can central remote controller control normally other indoor units? Is handling of central remote controller reflected on the operation status of indoor unit?
NO (Same as others)
Check central controller. Defect → Replace
YES
Does network adapter P.C. board LED (D01) go on?
NO
YES
Can handy remote controller control normally other indoor units?
NO
YES
Check network adapter P.C. board and power transformer. Defect → Replace
Check indoor P.C. board (MCC-1402 or MCC-1403). Defect → Replace

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

[E03 error] (Master indoor unit)

[E03 error] is detected when the indoor unit cannot receive a signal sent from the main remote controller (and central controller).

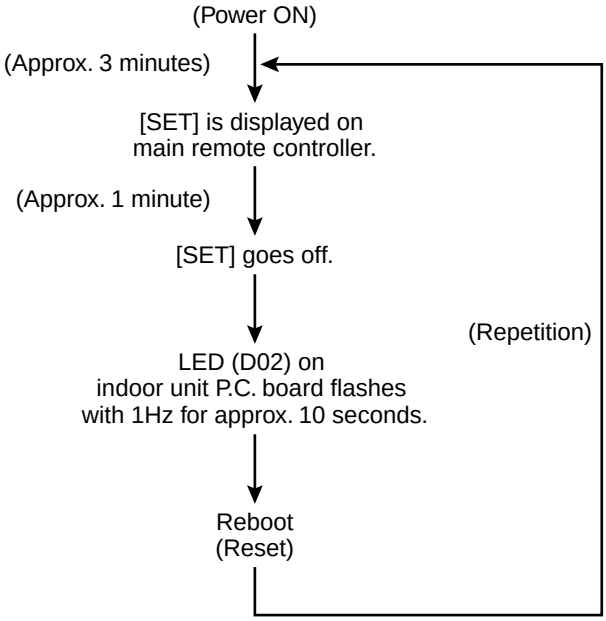
In this case, check the communication cables of the remote controllers A and B, the central control system X and Y. As communication is disabled, [E03] is not displayed on the main remote controller and the central controller. [E01] is displayed on the main remote controller and [97 error] on the central controller, respectively.

If [E03] occurs during an operation, the air conditioner stops.

[F29 error] / [12 error]

[F29 error] or [12 error] indicates detection of trouble which occurred on IC10 non-volatile memory (EEPROM) on the indoor unit P.C. board during operation of the air conditioner. Replace the service P.C. board.

* If EEPROM has not been inserted when the power was turned on or if EEPROM data never be read/written, the automatic address mode is repeated. In this time, the central controller displays [97 error].


(Power ON)
(Approx. 3 minutes)
[SET] is displayed on main remote controller.
(Approx. 1 minute)
[SET] goes off.
LED (D02) on indoor unit P.C. board flashes with 1Hz for approx. 10 seconds.
Reboot (Reset)
(Repetition)

[P31 error] (Sub indoor unit)

When the master unit of a group operation has detected [E03], [L03], [L07], or [L08] error, the sub unit of the group operation detects [P31 error] and then it stops. There is no display of the check code or alarm history of the main remote controller.

(In this model, the mode enters in automatic address set mode when the master unit has detected [E03], [L03], [L07], or [L08] error.)

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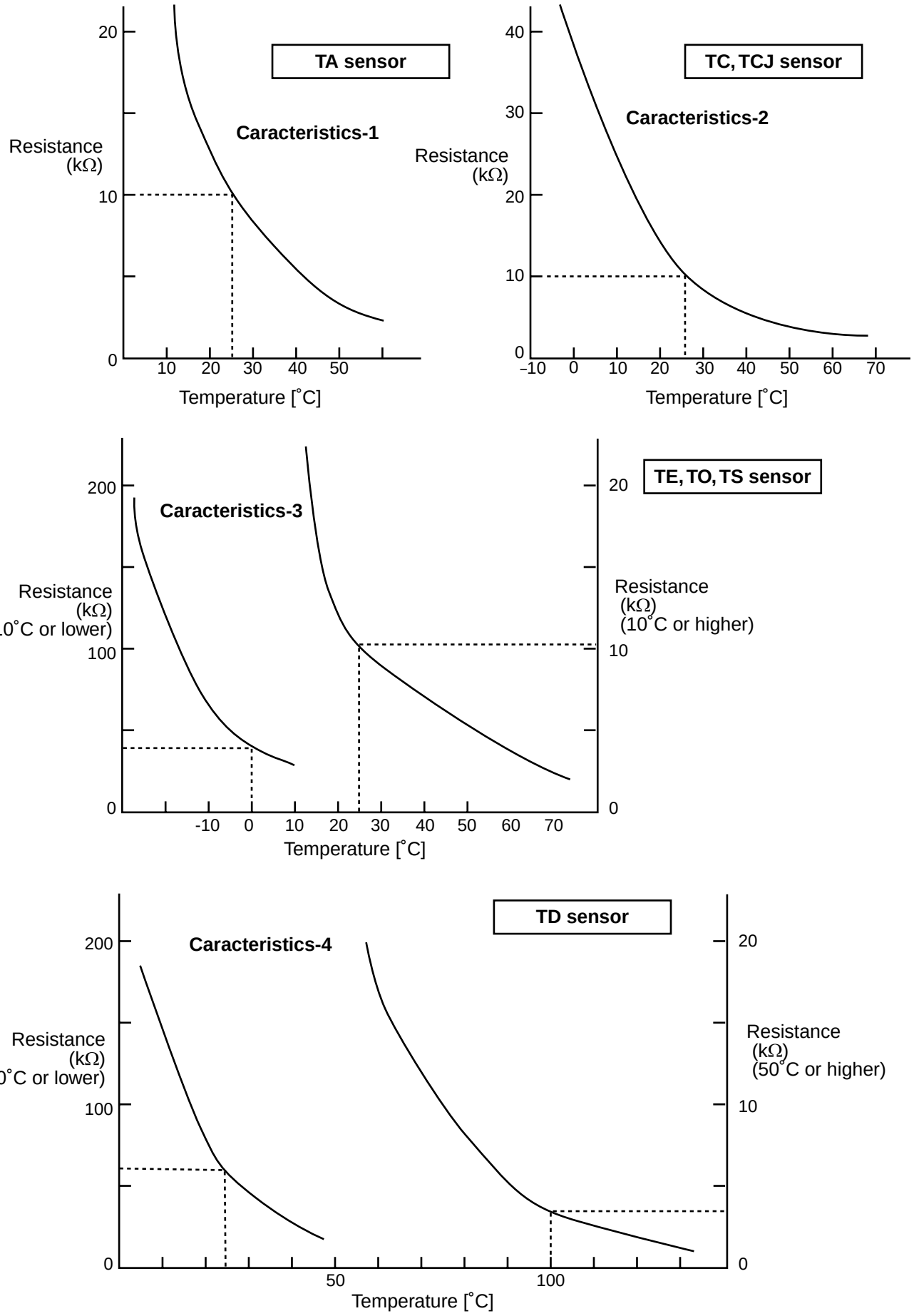
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

10-4-2. Relational Graph of Temperature Sensor Resistance Value and Temperature



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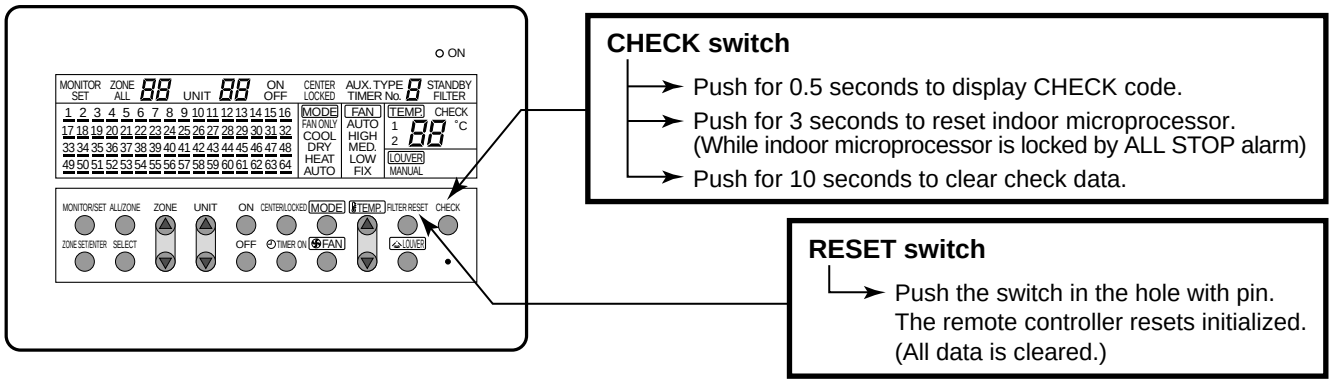
10-4-3. Troubleshooting with CHECK Display of Central Remote Controller

RAV-SM1100UT-E, RAV-SM1400UT-E, RAV-SM1100AT-E, RAV-SM1400AT-E (A03-003)

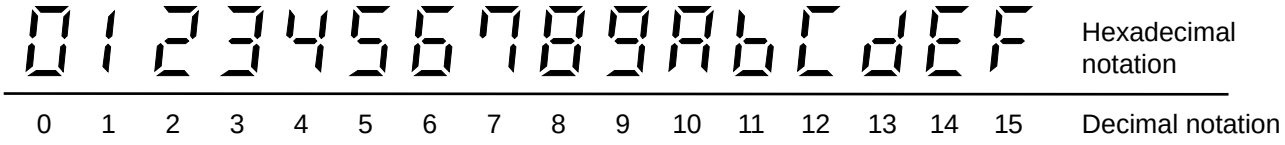
1. Operation for CHECK display

When pushing the CHECK switch, the indoor unit No. (Network address No.) including the check data is displayed in the UNIT No. display section, and the check code is displayed in the set up temp. display section.

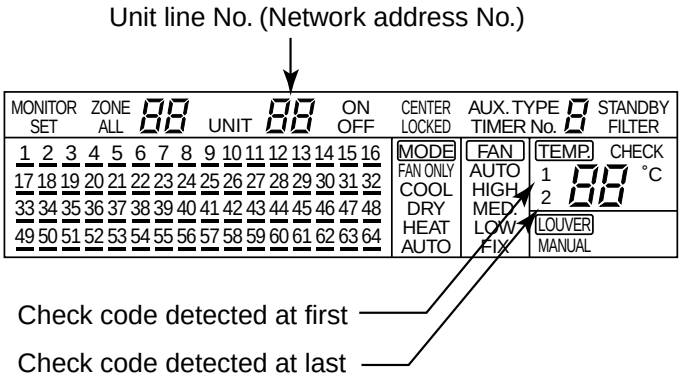


2. Reading of CHECK monitor display

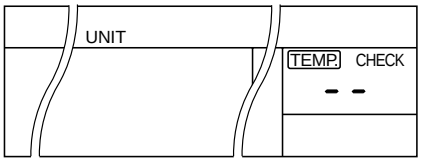
<7 segment display>



<Display on CHECK monitor>

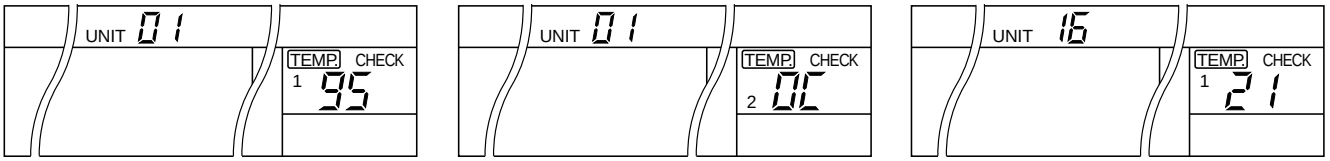


(Example)
There is no check data.



<CHECK data>

(Example)
In No.1 unit, first the interconnection wire (bus communication line) of indoor/outdoor has failed.
Next, the room temp. sensor is defective.
For No.16 unit, the high pressure switch at the inverter unit side operates.



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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

10-4-4. Check Code Table

RAV-SM1100UT-E, RAV-SM1400UT-E, RAV-SM1100AT-E, RAV-SM1400AT-E (A03-003)

Error mode detected by indoor unit (1)

Operation of diagnostic function					Judgment and measures
Block display	**Check code**	**Cause of operation**	**Status of air conditioner**	**Condition**	
[MODE] [TIMER] lamp 5Hz flash	04	The serial signal is not output from outdoor unit to indoor unit. • Miscabling of inter-unit cables • Defective serial sending circuit on outdoor P.C. board • Defective serial receiving circuit on outdoor P.C. board • Compressor case thermo operation	Operation continues	Displayed when error is detected	1. Outdoor unit does not completely operate. • Inter-unit cable check, correction of miscabling • Outdoor P.C. board check, P.C. board cables check • Compressor case thermo check 2. In normal operation When outdoor sending serial LED (Green) flashes, the receiving serial LED (Orange) also flashes. : Indoor P.C. board (Main P.C. board) check When the receiving serial LED (Orange) does not flash: Outdoor P.C. board check
	97	BUS communication circuit error * BUS communication was interrupted over the specified time.	Operation continues (According to remote controller of indoor unit)	Displayed when error is detected	1. Communication line check, miscabling check Power supply check for central controller (Central control remote controller, etc.) and indoor unit 2. Communication check (XY terminal) 3. Indoor P.C. board check 4. Central controller check (Communication P.C. board)
	98	Network address miss-setting • Addresses of central controllers (Central control remote controller, etc.) are duplicated.	Operation continues	Displayed when error is detected	1. Check central control system network address setting. (SW02) 2. Indoor P.C. board check 3. Central controller check (Communication P.C. board)
	08	Error in 4-way valve system • Indoor heat exchanger temperature rise after start of cooling operation. • Indoor heat exchanger temperature fall after start of heating operation.	Operation continues	Displayed when error is detected	1. Check 4-way valve. 2. Check 2-way valve and non-return valve. 3. Check indoor heat exchanger sensor (TC). 4. Check indoor P.C. board (Main P.C. board).
	09 *	Error in other cycles • Indoor heat exchanger temp (TC) does not vary after start of cooling/heating operation.	Operation continues	Displayed when error is detected	1. Compressor case thermo operation 2. Coming-off of detection part of indoor heat exchanger sensor 3. Check indoor heat exchanger sensor (TC). 4. Check indoor P.C. board (Main P.C. board).
[MODE] lamp 5Hz flash	0C	Coming-off, disconnection or short of indoor temp sensor (TA)	Operation continues	Displayed when error is detected	1. Check indoor temp sensor (TA). 2. Check indoor P.C. board (Main P.C. board).
	0d	Coming-off, disconnection or short of indoor temp sensor (TC)	Operation continues	Displayed when error is detected	1. Check indoor temp sensor (TC). 2. Check indoor P.C. board (Main P.C. board).
	0F	Coming-off, disconnection or short of indoor temp sensor (TCJ)	Operation continues	Displayed when error is detected	1. Check indoor temp sensor (TCJ). 2. Check indoor P.C. board (Main P.C. board).

* : No display in the setting at shipment

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Error mode detected by indoor unit (1)

Operation of diagnostic function					Judgment and measures
Block display	**Check code**	**Cause of operation**	**Status of air conditioner**	**Condition**	
[MODE] lamp 5Hz flash	11	Error in indoor fan system Revolutions frequency error of fan	All stop	Displayed when error is detected	1. Check indoor fan motor connector circuit (CN210). 2. Check indoor fan. 3. Check indoor P.C. board (Main P.C. board).
	12	Error in indoor unit or other positions 1. EEPROM access error	Operation continues	Displayed when error is detected	1. Check indoor P.C. board (EEPROM and peripheral circuits) (Main P.C. board).
	b5	Outside error input Detected by input voltage level from outside devices	Operation continues	Displayed when error is detected	1. Check outside devices. 2. Check indoor P.C. board (Main P.C. board).
	b6	Outside interlock input Detected by input voltage level from outside devices	All stop	Displayed when error is detected	1. Check outside devices. 2. Check indoor P.C. board (Main P.C. board).

Error mode detected by indoor unit (2)

Operation of diagnostic function				Judgment and measures
Check code	**Cause of operation**	**Status of air conditioner**	**Condition**	
99	Serial return signal is not sent from No. 1 indoor unit to remote controller. • Miscabling of inter-unit cable between remote controller and indoor unit • Miss-setting of indoor unit No. (Group address)	ON/OFF	Displayed when error is detected	1. Indoor unit does not completely operate. • Check inter-unit cable. • Check indoor P.C. board. (Main/Sub P.C. boards) • Check remote controller. 2. In normal operation • Check setting of indoor unit No. (SW01) (Sub P.C. board) • Check remote controller.

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Error mode detected by outdoor unit

Operation of diagnostic function				Judgment and measures
Check code	**Cause of operation**	**Status of air conditioner**	**Condition**	
14	Inverter over-current protective circuit operates. (For a short time)	All stop	Displayed when error is detected	1. Inverter immediately stops even if restarted. • Compressor rare short 2. Check IPDU. • Cabling error
17	Error on current detection circuit • Current value is high at AC side even while compressor stops. • Phase of power supply is missed.	All stop	Displayed when error is detected	1. Compressor immediately stops even if restarted. : Check IPDU. 2. Phase-missing operation of power supply • Check power voltage of R, S, T.
18	Coming-off, disconnection or short of outdoor temp sensor	All stop	Displayed when error is detected	1. Check outdoor temp sensor (TE, TS). 2. Check CDB.
19	Coming-off, disconnection or short of outdoor temp sensor	All stop	Displayed when error is detected	1. Check outdoor temp sensor (TD). 2. Check CDB.
1C	Compressor drive output error • Tin thermistor temp, Tin error (IPDU heat sink temp. is high.) Communication error between IPDU • Connector coming-off between CDB and IPDU	All stop	Displayed when error is detected	1. Abnormal overload operation of refrigerating cycle 2. Loosening of screws and contact error of IPDU and heat sink 3. Cooling error of heat sink 4. Check cabling of CDB and IPDU.
1d	Compressor does not rotate. (Over-current protective circuit works when constant time passed after activation of compressor.)	All stop	Displayed when error is detected	1. Compressor error (Compressor lock, etc.) : Replace compressor. 2. Cabling trouble of compressor (Phase missing)
1E	Discharge temp error • Discharge temp over specified value was detected.	All stop	Displayed when error is detected	1. Check refrigerating cycle. (Gas leak) 2. Error of electron control valve 3. Check pipe sensor (TD).
1F	Compressor breakdown • Operation frequency lowered and stops though operation had started.	All stop	Displayed when error is detected	1. Check power voltage. (AC200V±20V) 2. Overload operation of refrigerating cycle 3. Check current detection circuit at AC side.
21	High-voltage protection error by TE sensor • TE temp over specified value was detected.	All stop	Displayed when error is detected	1. Overload operation of refrigerating cycle 2. Check outdoor temp sensor (TE).
1A	DC outdoor fan motor error • IDC operation or lock was detected by DC outdoor fan driving.	All stop	Displayed when error is detected	1. Position detection error 2. Over-current protection circuit operation of outdoor fan drive unit • Check CDB. • Refer to Judgment of outdoor fan.
16	Error on IPDU position detection circuit	All stop	Displayed when error is detected	1. Position detection circuit operates even if driving by removing 3P connector of compressor. • Replace IPDU.
1b	Coming-off, disconnection or short of outdoor temp sensor	Operation continues	Displayed when error is detected	1. Check outdoor temp sensor (TO). 2. Check P.C. board.

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11. REPLACEMENT OF SERVICE INDOOR P.C. BOARD

[Requirement when replacing the service indoor P.C. board assembly]

In the non-volatile memory (Hereinafter said EEPROM, IC10) installed on the indoor P.C. board before replacement, the type and capacity code exclusive to the corresponding model have been stored at shipment from the factory and the important setup data such as system/indoor/group address set in (AUTO/MANUAL) mode or setting of high ceiling selection have been stored at installation time. Replace the service indoor P.C. board assembly according to the following procedure.

After replacement, check the indoor unit address and also the cycle by a test run.

<REPLACEMENT PROCEDURE>

CASE 1

Before replacement, power of the indoor unit can be turned on and the setup data can be readout from the wired remote controller.

Read EEPROM data *1

⇩

Replace service P.C. board & power ON *2

⇩

Write the read data to EEPROM *3

⇩

Power reset (All indoor units in the group when group operation)

CASE 2

Before replacement the setup data can not be readout from the wired remote controller.

Replace service P.C. board & power ON *2

⇩

Write the data such as high ceiling setup to EEPROM (According to the customers' information) *3

⇩

Power reset (All indoor units in the group when group operation)

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❒1 Readout of the setup data from EEPROM

(Data in EEPROM contents, which have been changed at the local site, are read out together with data in EEPROM set at shipment from the factory.)

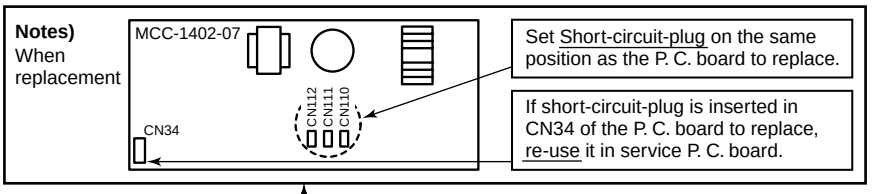
1. Push SET, CL, and ⚲ buttons of the remote controller at the same time for 4 seconds or more. ***1***
   (Corresponded with No. in Remote controller)
   When group operation, the master indoor unit address is displayed at the first time. In this time, the item code (DN) *10* is displayed. The fan of the selected indoor unit operates and the flap starts swinging if any.
2. Every pushing UNIT button, the indoor unit address in the group are displayed successively. ***2*** Specify the indoor unit No. to be replaced.
3. Using the set temperature ▲ / ▼ buttons, the item code (DN) can be moved up and down one by one. ***3***
4. First change the item code (DN) from *10* to *01*. (Setting of filter sign lighting time) Make a note of the set data displayed in this time.
5. Next change the item code (DN) using the set temperature ▲ / ▼ buttons. Also make a note of the set data.
6. Repeat item 5. and make a note of the important set data as shown in the later table (Ex.).
   • *01* to *9F* are provided in the item code (DN). On the way of operation, DN No. may come out.
7. After finishing making a note, push ⚲ button to return the status to usual stop status. ***6***
   (Approx. 1 minute is required to start handling of the remote controller.)

Minimum requirements for item code

DN	Contents
10	Type
11	Indoor unit capacity
12	Line address
13	Indoor address
14	Group address

(1) Type and capacity of the indoor unit is necessary to set the revolutions frequency of the fan.

(2) If Line/Indoor/Group addresses differ from those before replacement, the mode enters in automatic address setup mode and a manual resetting may be required.


Notes)
When replacement
MCC-1402-07
CN34
CN112
CN111
CN110
Set Short-circuit-plug on the same position as the P. C. board to replace.
If short-circuit-plug is inserted in CN34 of the P. C. board to replace, re-use it in service P. C. board.

❒2 Replacement of service P.C. board

1. Replace the P.C. board with a service P.C. board.
   In this time, setting of jumper line (cut) or setting of (short-circuit) connecting connectors on the former P.C. board should be reflected on the service P.C. board. (See Appendix 1, page 4)
2. According to the system configuration, turn on power of the indoor unit with any method in the following items.
   a) In case of single (individual) operation
      Turn on the power supply.
      1) Wait for completion of automatic address setup mode (Required time: Approx. 5 minutes) and then proceed to **❒3**.
         (Line address = 1, Indoor address = 1, Group address = 0 (Individual) are automatically set.)
      2) Push SET, CL, and ⚲ buttons of the remote controller at the same time for 4 seconds or more (***1*** operation), interrupt the automatic address setup mode, and then proceed to **❒3**.
         (Unit No. *ALL* is displayed.)
   b) In case of group operation
      Turn on power of the indoor unit of which P.C. board has been replaced with the service P.C. board with any method in the following items.
      1) Turn on power of the replaced indoor unit only.
         (However, the remote controller is also connected. Otherwise **❒3** operation cannot be performed.)
         Same as 1) and 2) in item a).
      2) Turn on power of the multiple indoor units including replaced indoor unit.
      • Only 1 system for twin, triple, double twin
      • For all units in the group
      Wait for completion of automatic address setup mode (Required time: Approx. 5 minutes) and then proceed to **❒3**.

* The master unit of a group may change by setup of automatic address. The line address/indoor address of the replaced indoor unit are automatically set to the vacant addresses except addresses belonging to other indoor units which have not been replaced. It is recommended to make a note that the refrigerant line which includes the corresponding indoor unit and that the corresponding indoor unit is master or sub in the group control.

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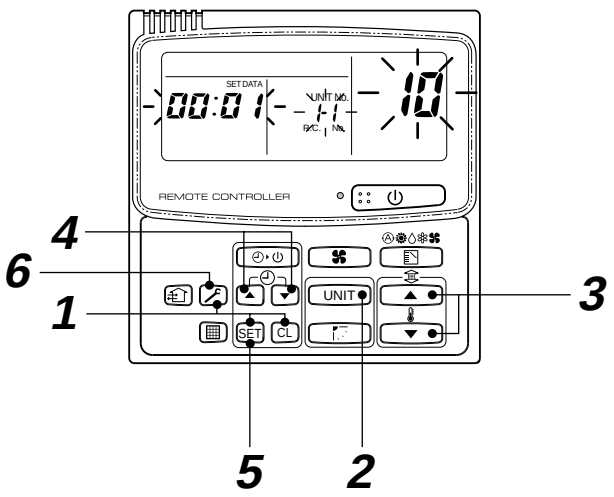
❒3 Writing of the setup contents to EEPROM

(The contents of EEPROM installed on the service P.C. board have been set up at shipment from the factory.)

1. Push SET, CL, and button of the remote controller at the same time for 4 seconds or more. ***1***
   (Corresponded with No. in Remote controller)
   In group operation control, the master indoor unit No. is displayed at the first time. (If the automatic address setup mode is interrupted in item 2. - a) - 2) in the previous page, the unit No. ALL is displayed.) In this time, the item code (DN) 10 is displayed. The fan of the selected indoor unit operates and the flap starts swinging if any.
2. Every pushing UNIT button, the indoor unit numbers in the group control are displayed successively. ***2***
   Specify the indoor unit No. of which P.C. board has been replaced with a service P.C. board.
   (When the unit No. ALL is displayed, this operation cannot be performed.)
3. Using the set temperature ▲ / ▼ buttons, the item code (DN) can be moved up and down one by one. ***3***
4. First set a type and capacity of the indoor unit.
   (Setting the type and capacity writes the data at shipment from the factory in EEPROM.)
   1) Set the item code (DN) to 10. (As it is)
   2) Using the timer time ▲ / ▼ buttons, set up a type. ***4***
      (For example, 4-way air discharge cassette type is 0001) Refer to the attached table.
   3) Push SET button. (OK when the display goes on.) ***5***
   4) Using the set temperature ▲ / ▼ buttons, set 11 to the item code (DN).
   5) Using the timer time ▲ / ▼ buttons, set the capacity.
      (For example, 0012 for class 80) Refer to the attached table.
   6) Push SET button. (OK when the display goes on.)
   7) Push button to return the status to usual stop status. ***6***
      (Approx. 1 minute is required to start handling of the remote controller.)
5. Next write the contents which have been set up at the local site such as the address setup in EEPROM.
   Repeat the above procedure 1. and 2.
6. Using the set temperature ▲ / ▼ buttons, set 01 to the item code (DN).
   (Setup of lighting time of filter sign)
7. The contents of the displayed setup data in this time should be agreed with the contents in the previous memorandum in **❒1**.
   1) If data disagree, change the displayed setup data to that in the previous memorandum by the timer time ▲ / ▼ buttons, and then push SET button. (OK when the display goes on.)
   2) There is nothing to do when data agrees.
8. Using the set temperature ▲ / ▼ buttons, change the item code (DN).
   As same as the above, check the contents of the setup data and then change them to data contents in the previous memorandum.
9. Then repeat the procedure 7. and 8.
10. After completion of setup, push button to return the status to the usual stop status. ***6***
    (Approx. 1 minute is required to start handling of the remote controller.)

* 01 to 9F are provided in the item code (DN).
On the way of operation, DN No. may come out.
When data has been changed by mistake and SET button has been pushed, the data can be returned to the data before change by pushing CL button if the item code (DN) was not yet changed.

<REMOTE CONTROLLER>



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Memorandum for setup contents (Item code table (Example))

DN	Item	Memo	At shipment
01	Filter sign lighting time		According to type
02	Dirty state of filter		0000: Standard
03	Central control address		0099: Unfixed
06	Heating suction temp shift		0002: +2°C (Floor type: 0)
0F	Cooling only		0000: Shared for cooling/heating
10	Type		According to model type
11	Indoor unit capacity		According to capacity type
12	Line address		0099: Unfixed
13	Indoor unit address		0099: Unfixed
14	Group address		0099: Unfixed
19	Flap type (Adjustment of air direction)		According to type
1E	Temp difference of automatic cooling/ heating selecting control points		0003: 3 deg (Ts ± 1.5)
28	Automatic reset of power failure		0000: None
2A	Option		0002:
2b	Thermo output selection (T10 ‡B)		0000: Thermo ON
2E	Option		0000:
32	Sensor selection		0000: Body sensor
5d	High ceiling selection		0000: Standard
60	Timer set (Wired remote controller)		0000: Available
8b	Correction of high heat feeling		0000: None

Type

Item code [10]

Setup data	Type	Abbreviated name
0001*	4-way air discharge cassette	RAV-SM560/800UT-E, RAV-SP1100UT-E
0038		RAV-SM1100/1400UT-E
0004	Concealed duct	RAV-SM560/800BT-E RAV-SM561/801/1101/1401BT-E
0007	Under ceiling	RAV-SM561/801/1101/1401CT-E

* Initial setup value of EEPROM installed on the service P.C. board

Indoor unit capacity

Item code [11]

Setup data	RAV-560BT-E, RAV-560UT-E, RAV-561BT-E, RAV-561CT-E RAV-800BT-E, RAV-800UT-E, RAV-801BT-E, RAV-801CT-E
0000*	Invalid
0009	560
0012	800

Setup data	RAV-1100UT-E, RAV-1101BT-E, RAV-1101CT-E RAV-1400UT-E, RAV-1401BT-E, RAV-1401CT-E, RAV-SP1100UT-E
0000*	Invalid
0015	1100
0017	1400

* Initial setup value of EEPROM installed on the service P.C. board

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12. SETUP AT LOCAL SITE AND OTHERS

12-1. Indoor Unit

12-1-1. Test Run Setup on Remote Controller

RAV-SM560UT-E, RAV-SM560BT-E,
RAV-SM800UT-E, RAV-SM800BT-E (A02-014)

<Wired remote controller>

1. When pushing button on the remote controller for 4 seconds or more, “TEST” is displayed on LC display. Then push button.
   - “TEST” is displayed on LC display during operation of Test Run.
   - During Test Run, temperature cannot be adjusted but air volume can be selected.
   - In heating and cooling operation, a command to fix the Test Run frequency is output.
   - Detection of error is performed as usual. However, do not use this function except case of Test Run because it applies load on the unit.
2. Use either heating or cooling operation mode for [TEST].
   NOTE : The outdoor unit does not operate after power has been turned on or for approx. 3 minutes after operation has stopped.
3. After a Test Run has finished, push button again and check that [TEST] on LC display has gone off. (To prevent a continuous test run operation, 60-minutes timer release function is provided to this remote controller.)

<Wireless remote controller> (Option for 4-way air discharge cassette type)

1 **Turn off power of the unit.**

Remove the adjuster attached with sensors from the ceiling panel. For removing, refer to the Installation manual attached to the ceiling panel. (Be careful to handle the adjuster because cables are connected to the sensor.) Remove the sensor cover from the adjuster. (1 screw)

2 **Change ON of Bit [1: TEST] of the sensor P.C. board switch [S003] to OFF.**

Mount the sensor cover and mount the adjuster with sensor to the ceiling panel.

Turn on power of the unit.

3 **Push button on the wireless remote controller and select [COOL] or [HEAT] operation mode using button.**
(All the display lamps of sensors on the wireless remote controller flash during Test Run.)

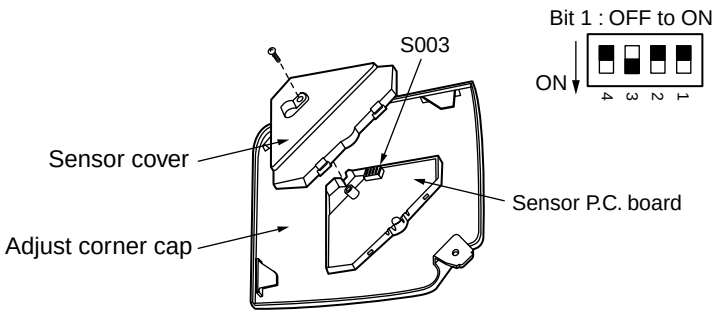
- Do not perform Test Run operation in other modes than [HEAT] / [COOL] mode.
- Detection of error is performed as usual.

4 **After Test Run operation, push button to stop the operation.**

5 **Turn off power of the unit.**

Return Bit [1] of the sensor P.C. board switch [S003] to the original position. (ON → OFF)

Mount the adjuster with sensors to the ceiling panel.



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<Wired remote controller>

1. When pushing button on the remote controller for 4 seconds or more, “TEST” is displayed on LC display. Then push button.
   - “TEST” is displayed on LC display during operation of Test Run.
   - During Test Run, temperature cannot be adjusted but air volume can be selected.
   - In heating and cooling operation, a command to fix the Test Run frequency is output.
   - Detection of error is performed as usual. However, do not use this function except case of Test Run because it applies load on the unit.
2. Use either heating or cooling operation mode for [TEST].
   NOTE : The outdoor unit does not operate after power has been turned on or for approx. 3 minutes after operation has stopped.
3. After a Test Run has finished, push button again and check that [TEST] on LC display has gone off. (To prevent a continuous test run operation, 60-minutes timer release function is provided to this remote controller.)

12-1-2. Setup to Select Function

<Procedure> Use this function while the indoor unit stops.

1 **Push SET, CL, and buttons concurrently for 4 seconds or more.**
The unit No. displayed at the first time indicates the indoor unit address of the master unit in the group control.
In this time, fan and flap of the selected indoor unit operate.

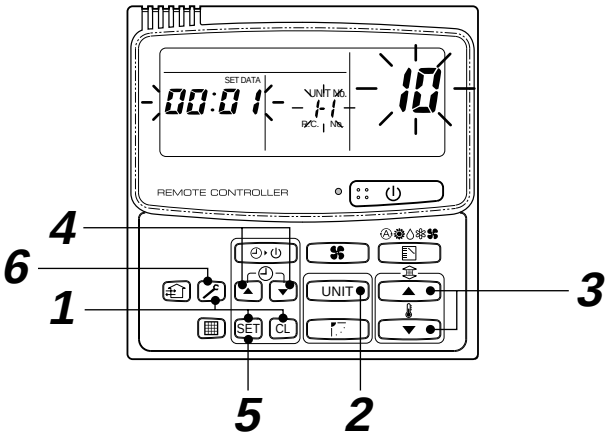
2 **Every pushing UNIT button, the indoor unit numbers in the group control are displayed successively. In this time, fan and flap of the selected indoor unit only operate.**

3 **Using the set temperature / buttons, set the item code (DN).**

4 **Using the timer time / buttons, select the setup data.**

5 **Push SET button. (OK if display goes on.)**
- To change the selected indoor unit, proceed to ***2***.
- To change the item to be set, proceed to ***3***.

6 **Pushing button returns the status to usual stop status.**



<Operation procedure>

1 → ***2*** → ***3*** → ***4*** → ***5*** → ***6*** END

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RAV-SM561BT-E, RAV-SM801BT-E, RAV-SM1101BT-E, RAV-SM1401BT-E (A03-007)

<Procedure> Use this function while the indoor unit stops.

1 **Push SET, CL, and buttons concurrently for 4 seconds or more.**
The unit No. displayed at the first time indicates the indoor unit address of the master unit in the group control.
In this time, fan and flap of the selected indoor unit operate.

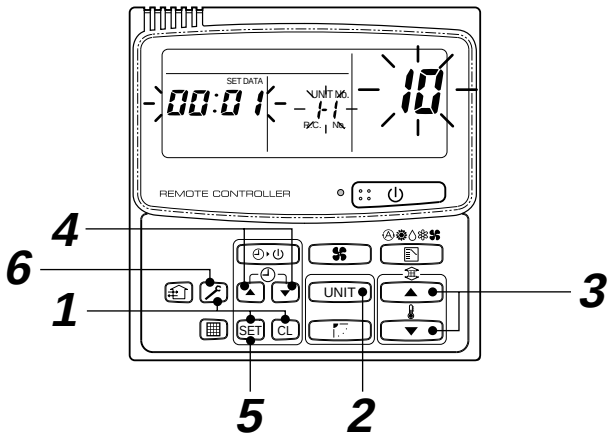
2 **Every pushing UNIT button, the indoor unit numbers in the group control are displayed successively. In this time, fan and flap of the selected indoor unit only operate.**

3 **Using the set temperature ▲ / ▼ buttons, set the item code (DN).**

4 **Using the timer time ▲ / ▼ buttons, select the setup data.**

5 **Push SET button. (OK if display goes on.)**
- To change the selected indoor unit, proceed to ***2***.
- To change the item to be set, proceed to ***3***.

6 **Pushing button returns the status to usual stop status.**



<Operation procedure>

1→ 2→ 3→ 4→ 5→ 6 END

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Item No. (DN) table (Selection of function)

DN	Item	Description	At shipment
01	Filter sign lighting time	0000 : None 0002 : 2500H (4-Way/Duct/Ceiling Type)	0002 for D.I. and S.D.I. models
02	Dirty state of filter	0000 : Standard 0001 : High degree of dirt (Half of standard time)	0000 : Standard
03	Central control address	0001 : No.1 unit to 0064 : No.64 unit 0099 : Unfixed	0099 : Unfixed
06	Heating suction temp shift	0000 : No shift 0001 : +1°C 0002 : +2°C to 0010 : -10°C (Up to recommendation + 6)	0002 : +2°C (Floor type 0000: 0°C)
0F	Cooling only	0000 : Heat pump 0001 : Cooling only (No display of [AUTO] [HEAT])	0000 : Shared for cooling/ heating
10	Type	0001 : 560/800UT type 0006 : 560/800BT type, 561/801/1101/1401BT type 0007 : 561/801/1101/1401CT type 0038 : 1100/1400UT type	According to model type
11	Indoor unit capacity	0000 : Unfixed 0009 : 560/561 type 0012 : 800/801 type 0015 : 1100/1101 type 0017 : 1400 type	According to capacity type
12	Line address	0001 : No.1 unit to 0030 : No.30 unit	0099 : Unfixed
13	Indoor unit address	0001 : No.1 unit to 0064 : No.64 unit	0099 : Unfixed
14	Group address	0000 : Individual 0001 : Master of group 0002 : Sub of group	0099 : Unfixed
19	Flap type (Adjustment of air direction)	0000 : No flap 0001 : Swing only 0004 : 4-way	According to type
1E	Temp difference of automatic cooling/ heating mode selection COOL → HEAT, HEAT →COOL	0000 : 0 deg to 0010 : 10 deg (For setup temperature, reversal of COOL/HEAT by ± (Data value)/2)	0003 : 3 deg (Ts±1.5)
28	Automatic restart of power failure	0000 : None 0001 : Restart	0000 : None
2A	Option		0002 : Default
2b	Thermo output selection (T10 ③)	0000 : Indoor thermo ON 0001 : Output of outdoor comp-ON receiving	0000: Thermo. ON
2E	Option		0000 : Default
30	Option		0000 : Default
31	Option		0000 : Default
32	Sensor selection	0000 : Body TA sensor 0001 : Remote controller sensor	0000 : Body sensor
33	Temperature indication	0000 : °C (celsius) 0001 : °F (Fahrenheit)	0000 : °C
40	Option		0003 : Default
5d	High ceiling selection (Air volume selection)	0000 : Standard filter 0001 : Oil guard, Super-long life, Optical regenerative deodorization 0003 : High performance (65%), High performance (90%), High antibacterial performance (65%)	0000 : Standard
60	Timer set (Wired remote controller)	0000 : Available (Operable) 0001 : Unavailable (Operation prohibited)	0000 : Available
8b	Correction of high heat feeling	0000 : None 0001 : Correction	0000 : None

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

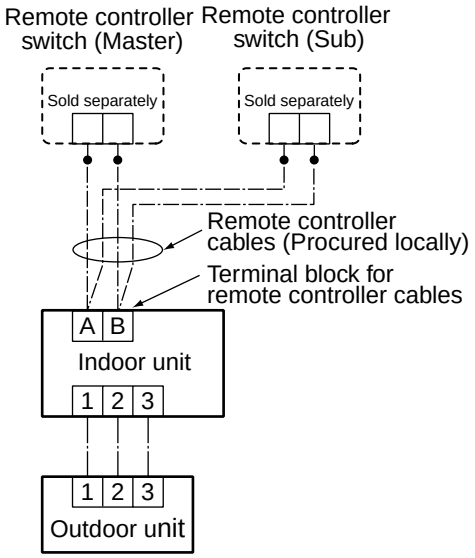
12-1-3. Cabling and Setting of Remote Controller Control

RAV-SM560UT-E, RAV-SM560BT-E,
RAV-SM800UT-E, RAV-SM800BT-E (A02-014)

2-remote controller control (Controlled by two remote controllers)

One or multiple indoor units are controlled by two remote controllers.
(Max. 2 remote controllers are connectable.)

- **1 indoor unit is controlled by 2 remote controllers**



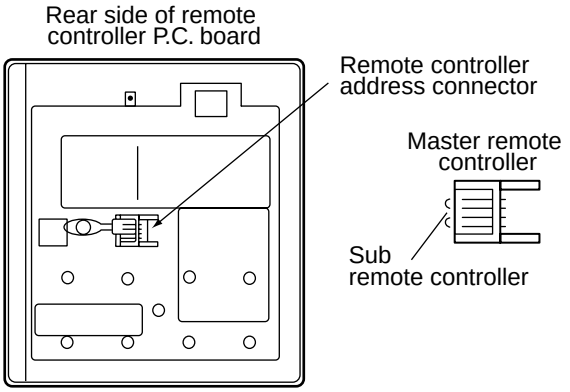
(Setup method)

One or multiple indoor units are controlled by two remote controllers.
(Max. 2 remote controllers are connectable.)

<Wired remote controller>

How to set wired remote controller to sub remote controller

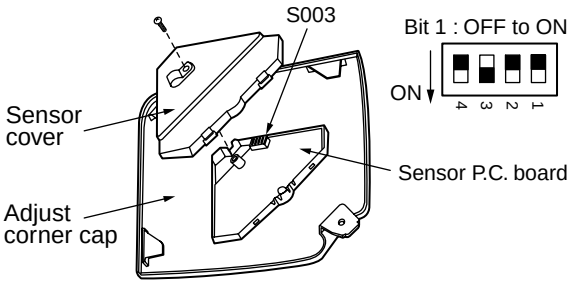
Insert the remote controller address connector provided on the rear side of the remote controller switch P.C. board into Sub in exchange for Master.


Rear side of remote controller P.C. board
Remote controller address connector
Master remote controller
Sub remote controller

<Wireless remote controller>

How to set wireless remote controller to sub remote controller

Change OFF of Bit [3: Remote controller Sub/ Master] of switch S003 to ON.



[Operation]

1. The operation contents can be changed by Last-push-priority.
2. Use a timer on either Master remote controller or Sub remote controller.

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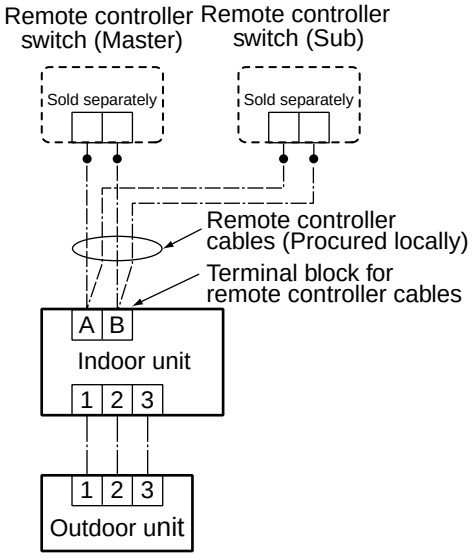
RAV-SM561BT-E, RAV-SM801BT-E, RAV-SM1101BT-E, RAV-SM1401BT-E (A03-007)

2-remote controller control (Controlled by two remote controllers)

One or multiple indoor units are controlled by two remote controllers.
(Max. 2 remote controllers are connectable.)

- **1 indoor unit is controlled by 2 remote controllers**



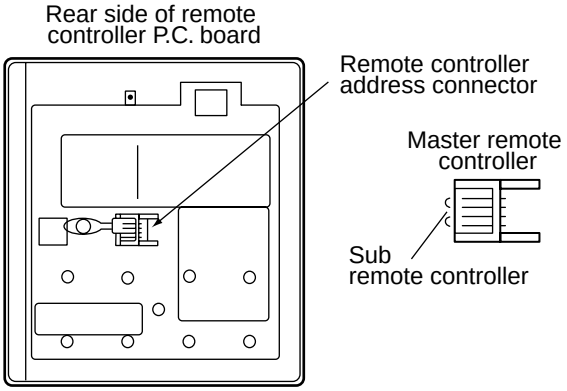
(Setup method)

One or multiple indoor units are controlled by two remote controllers.
(Max. 2 remote controllers are connectable.)

<Wired remote controller>

How to set wired remote controller to sub remote controller

Insert the remote controller address connector provided on the rear side of the remote controller switch P.C. board into Sub in exchange for Master.


Rear side of remote controller P.C. board
Remote controller address connector
Master remote controller
Sub remote controller

[Operation]

1. The operation contents can be changed by Last-push-priority.
2. Use a timer on either Master remote controller or Sub remote controller.

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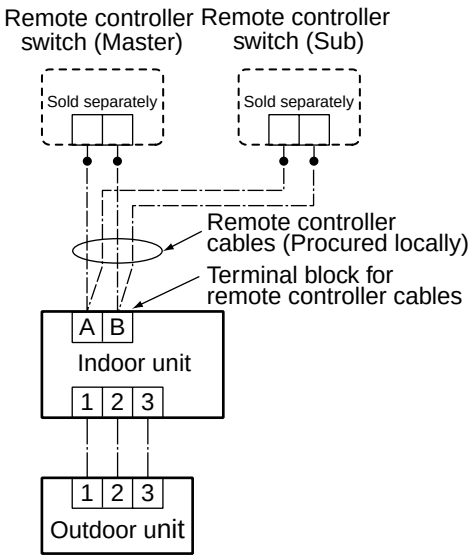
RAV-SM561CT-E, RAV-SM801CT-E, RAV-SM1101CT-E, RAV-SM1401CT-E (A03-016)

2-remote controller control (Controlled by two remote controllers)

One or multiple indoor units are controlled by two remote controllers.
(Max. 2 remote controllers are connectable.)

- **1 indoor unit is controlled by 2 remote controllers**



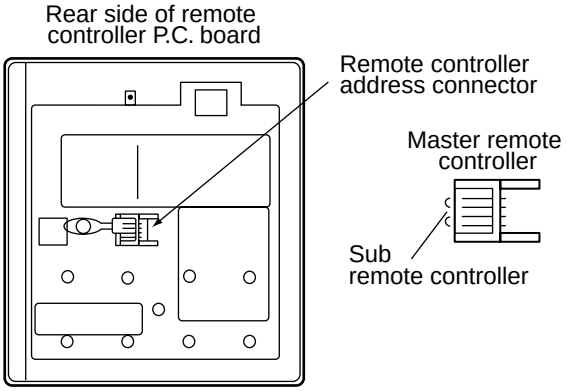
(Setup method)

One or multiple indoor units are controlled by two remote controllers.
(Max. 2 remote controllers are connectable.)

<Wired remote controller>

How to set wired remote controller to sub remote controller

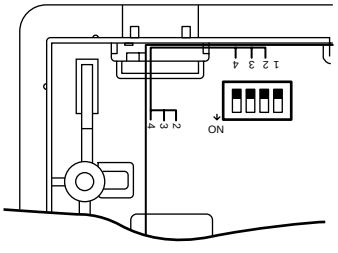
Insert the remote controller address connector provided on the rear side of the remote controller switch P.C. board into Sub in exchange for Master.


Rear side of remote controller P.C. board
Remote controller address connector
Master remote controller
Sub remote controller

<Wireless remote controller> (For RAV-SM561/801/1101/1401CT-E only)

How to set wireless remote controller to sub remote controller

Change OFF of Bit [3: Remote controller Sub/Master] of switch S003 to ON.



[Operation]

1. The operation contents can be changed by Last-push-priority.
2. Use a timer on either Master remote controller or Sub remote controller.

Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

12-1-4. Monitor Function of Remote Controller Switch

■ **Call of sensor temperature display**

<Contents>

Each sensor temperature of the remote controller, indoor unit, and outdoor unit can become known by calling the service monitor mode from the remote controller.

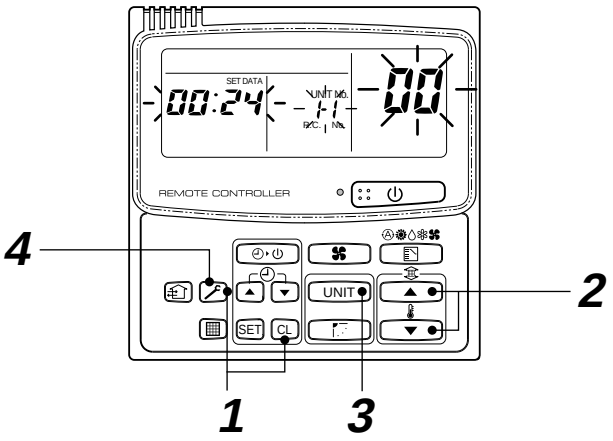
<Procedure>

1 **Push CL + button simultaneously for 4 seconds or more to call the service monitor mode.**

The service monitor goes on, the master indoor unit No. is displayed, and then temperature of the **item code** *00* is displayed.

2 **Push the temperature setup ▲ / ▼ buttons to select the sensor No. (Item code) of the sensor to be monitored.**

The sensor numbers are described below:



<Operation procedure>

1 → ***2*** → ***3*** → ***4***

Returned to usual display

	Item code	Data name		Item code	Data name
Indoor unit data	00	Room temp (under control) *1	Outdoor unit data	60	Heat exchanger temp TE
	01	Room temp (remote controller)		61	Outside temp TO
	02	Indoor suction temp		62	Discharge temp TD
	03	Indoor coil temp (TCJ)		63	Suction temp TS
	04	Indoor coil temp (TC)		64	—
				65	Heat sink temp THS

*1 Only master unit in group control

3 **The temperature of indoor units and outdoor unit in a group control can be monitored by pushing UNIT button to select the indoor unit to be monitored.**

4 **Pushing button returns the display to usual display.**

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■ **Calling of error history**

<Contents>

The error contents in the past can be called.

<Procedure>

1 **Push CL + F buttons simultaneously for 4 seconds or more to call the service check mode.**

Service Check goes on, the **item code** 01 is displayed, and then the content of the latest alarm is displayed. The number and error contents of the indoor unit in which an error occurred are displayed.

2 **In order to monitor another error history, push the set temperature ▲ / ▼ buttons to change the error history No. (Item code).**

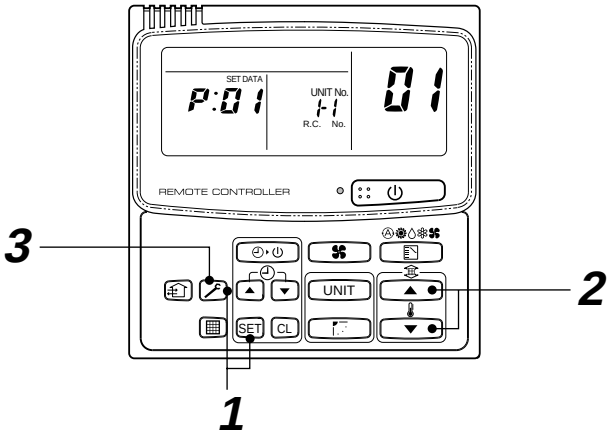
Item code 01 (Latest) → **Item code** 04(Old)

NOTE : Four error histories are stored in memory.

3 **Pushing F button returns the display to usual display.**

<Requirement>

Do not push CL button, otherwise all the error histories of the indoor unit are deleted.



<Operation procedure>

1 → 2 → 3

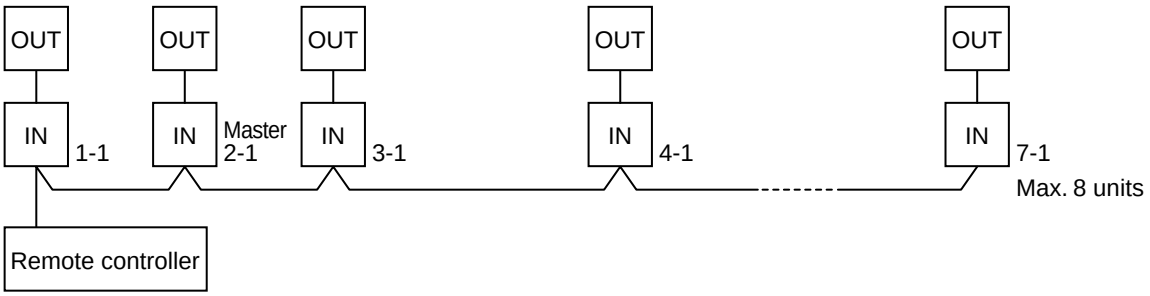
Returned to usual display

(Group control operation)

In a group control, operation of maximum 8 indoor units can be controlled by a remote controller.

The indoor unit connected with outdoor unit (Individual/Master of twin) controls room temperature according to setting on the remote controller.

<System example>



(1) Display range on remote controller

The setup range (Operation mode/Air volume select/Setup temp) of the indoor unit which was set to the master unit is reflected on the remote controller.

(2) Address setup

Turn on power of the indoor unit to be controlled in a group within 3 minutes after setting of automatic address.

If power of the indoor unit is not turned on within 3 minutes (completion of automatic address setting), the system is rebooted and the automatic address setting will be judged again.

1) Connect 3 In/Out cables surely.
2) Check line address/indoor address/group address of the unit one by one.
3) The unit No. (line/indoor gout address) which have been set once keep the present status as a rule if the unit No. is not duplicated with one of another unit.

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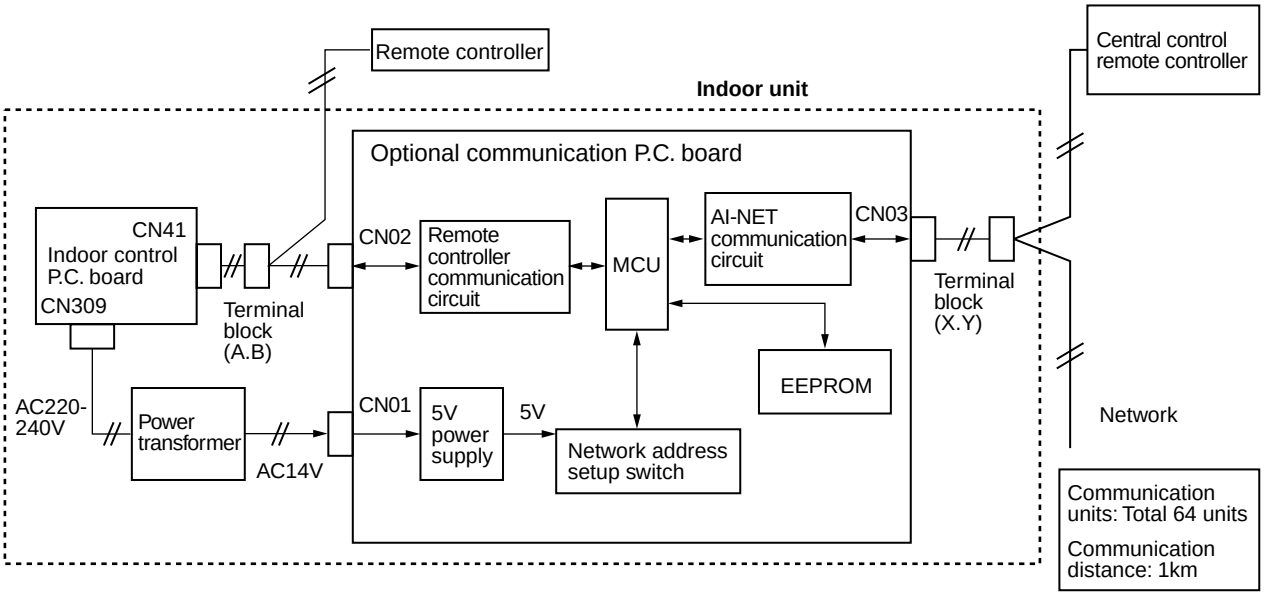
12-2. Network Adapter

Model name: TCB-PCNT20E

12-2-1. Function

A network adapter is an optional P.C. board to connect the indoor unit to AI net (Central control remote controller).

12-2-2. Microcomputer Block Diagram



12-2-3. Network Address Setup Switch (SW01)

No.	Item	Setup contents
1	LSB	1 2 3 4 5 6
2	Central control address	× × × × × × : No.1 unit × : Switch OFF
3		○ × × × × × : No.2 unit ○ : Switch OFF
4		:
5		○ ○ ○ ○ ○ × : No.63 unit
6	MSB	○ ○ ○ ○ ○ ○ : No.64 unit
7	Setup availability from remote controller	Switch OFF : Setup available from remote controller
8		Switch ON : Setup unavailable from remote controller

12-2-4. LED Display Specification

LED No.	Function	Go on	Go off
D01 (Red)	Communication status: Remote controller	During communication	No communication (including communication error)
D02 (Red)	Communication status: Center	During communication	No communication (including communication error)
D03 (Red)	Operation status of air conditioner	Running	Stop
D04 (Red)	Air conditioner error	Error	Normal

* For positions of LED, refer to P.C. board external view.

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

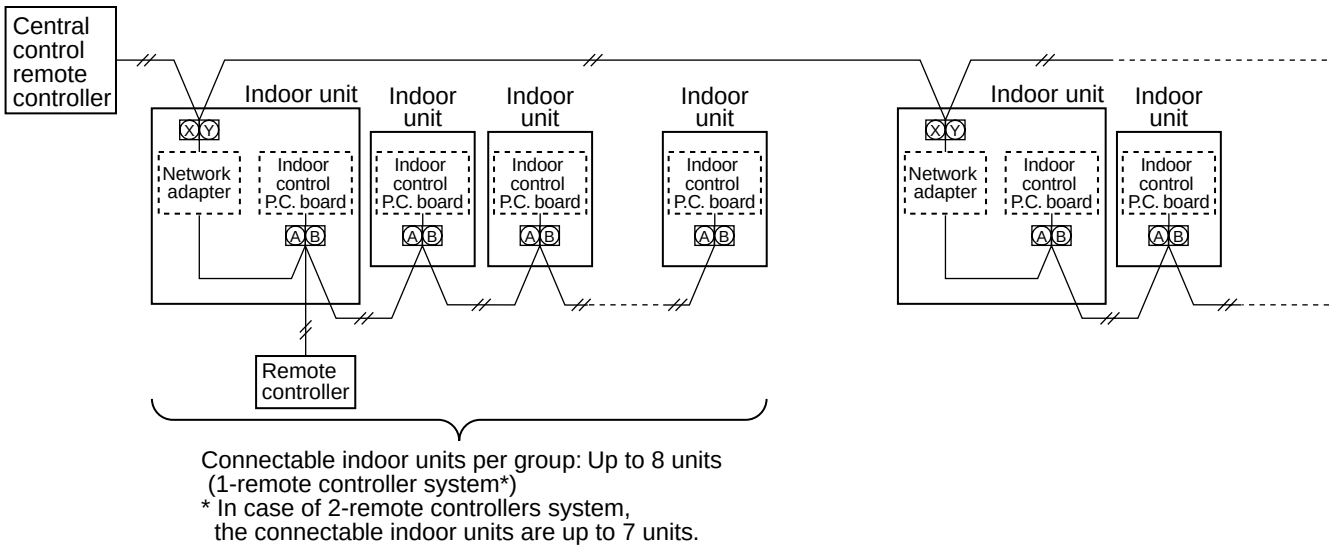
12-2-5. Communication Cable Specifications

No.	Communication circuit	Communication cable specifications	
1	Remote controller communication side	Cable	Neutral 2-cable type
		Cable type	CVV (JIS C3401) Controlling vinyl insulation vinyl seal cable VCTF (JIS C3306) Vinyl cab tire round type cord VCT (JIS C3401) 600V vinyl cab tire cable VVR (JIS C3401) Vinyl insulation seal cable round type MVVS Cable with net shielding for instrumentation CPEVS Shielded polyethylene insulation vinyl seal cable
		Cable dia.	0.5 to 2.0 mm²
		Cable length	Total cable length Max. 500m (Up to 400m when there is wireless remote controller in group)
2	AI NET side	Cable	Neutral 2-cable type
		Cable type	MVVS Cable with net shielding for instrumentation
		Cable dia.	1.25 mm² ≤ 500 m, 2.0 mm² ≤ 1 km
		Cable length	Total cable length : Up to 500m when using 1.25mm² cable, Up to 1000m when using 2.0mm² cable

12-2-6. Cable Connection

<Network cable connection>

- Install a network adapter per 1 group of the group control (including single unit control). Also install a network adapter to one of the indoor units in the group control.



Connectable indoor units per group: Up to 8 units
(1-remote controller system*)
* In case of 2-remote controllers system,
the connectable indoor units are up to 7 units.

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

12-3. How to Set an Address Number

When connecting indoor units to the central control remote controller by using a network adapter, it is required to set up a network address No.

- The network address No. should be agreed with the line No. of the central control remote controller.
- When the unit was shipped from the factory, the network address has been set to 1.

The following two methods to set the network address are provided.

1. How to set from the remote controller at indoor unit side

* This method is effective only when ⑦ of set switch SW01 on the network adapter P.C. board is turned off.

<Procedure> Set the network address while the unit stops.

1 **Push [TEST] + [TIME] buttons for 4 seconds or more.**

In the group control, the unit No RLL is displayed, and then all the indoor units in the group control are selected. In this time, fans of all the selected indoor units are turned on. (Fig. 1)
(Keep status of RLL display without pushing [UNIT] button.)

For the individual remote controller which is not included in a group control, the line address and the indoor unit address are displayed.

2 **Specify the item code 03 using the temperature setup [▲] / [▼] buttons.**

3 **Using the timer time [▲] / [▼] buttons, select the setup data.**

The setup data are shown in the right table (Table 1).

4 **Push [SET] button. (OK if display goes on)**

- To change the item to be set, return to **2**.

5 **Push [TEST] button.**

The status returns to the usual stop status.

Fig. 1

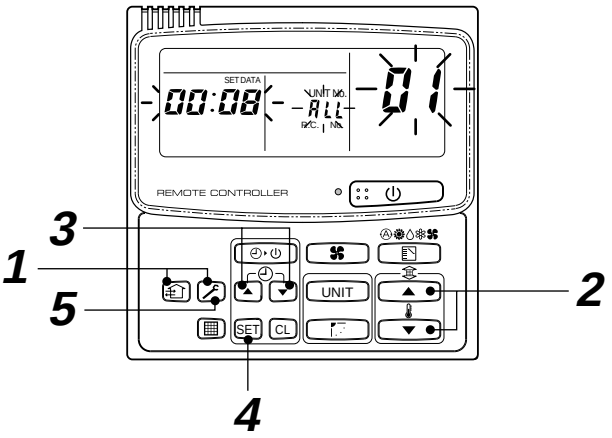

Table 1

Setup data	Network address No.
0001	1
0002	2
0003	3
:	:
0064	64
0099	Unset (Setup at shipment from factory)

2. How to set by the switch on the network adapter P.C. board

When the remote controller cannot be found or when you don't want to change setting of the network address No. from the remote controller, use the setup switch SW01 on the network adapter P.C. board (Network address No. setup switch) to set the address No.

<Procedure>

(1) Turn off the power.

(2) Turn ⑦ of the address No. setup switch SW01 to ON side. Accordingly the address No. set on the remote controller is invalidated. (See Fig. 2.)

(3) Set the network address No. with combination of ON and OFF of ⑥ to ① of the address No. setup switch SW01. The relation between combination of ON/OFF and address No. is described in Table 2. The right figure (Fig. 3) shows an example of case that the address No. is set to 16.

When the network address No. has been changed, be sure to turn of power of the central control remote controller again or to reset the remote controller using the reset hole on the operation panel of the central control remote controller.

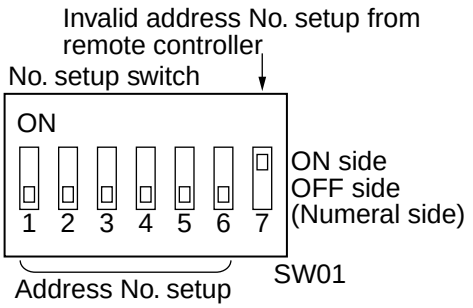

Fig. 2

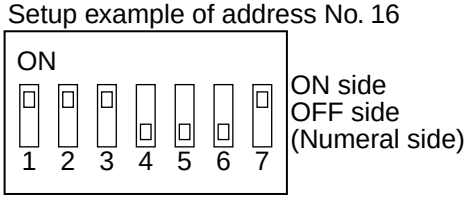

Fig. 3

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Table 2 Network address No. setup table (SW01)

○ : ON side
× : OFF side

Address No.	①	②	③	④	⑤	⑥
01	×	×	×	×	×	×
02	○	×	×	×	×	×
03	×	○	×	×	×	×
04	○	○	×	×	×	×
05	×	×	○	×	×	×
06	○	×	○	×	×	×
07	×	○	○	×	×	×
08	○	○	○	×	×	×
09	×	×	×	○	×	×
10	○	×	×	○	×	×
11	×	○	×	○	×	×
12	○	○	×	○	×	×
13	×	×	○	○	×	×
14	○	×	○	○	×	×
15	×	○	○	○	×	×
16	○	○	○	○	×	×
17	×	×	×	×	○	×
18	○	×	×	×	○	×
19	×	○	×	×	○	×
20	○	○	×	×	○	×
21	×	×	○	×	○	×
22	○	×	○	×	○	×
23	×	○	○	×	○	×
24	○	○	○	×	○	×
25	×	×	×	○	○	×
26	○	×	×	○	○	×
27	×	○	×	○	○	×
28	○	○	×	○	○	×
29	×	×	○	○	○	×
30	○	×	○	○	○	×
31	×	○	○	○	○	×
32	○	○	○	○	○	×

Address No.	①	②	③	④	⑤	⑥
33	×	×	×	×	×	○
34	○	×	×	×	×	○
35	×	○	×	×	×	○
36	○	○	×	×	×	○
37	×	×	○	×	×	○
38	○	×	○	×	×	○
39	×	○	○	×	×	○
40	○	○	○	×	×	○
41	×	×	×	○	×	○
42	○	×	×	○	×	○
43	×	○	×	○	×	○
44	○	○	×	○	×	○
45	×	×	○	○	×	○
46	○	×	○	○	×	○
47	×	○	○	○	×	○
48	○	○	○	○	×	○
49	×	×	×	×	○	○
50	○	×	×	×	○	○
51	×	○	×	×	○	○
52	○	○	×	×	○	○
53	×	×	○	×	○	○
54	○	×	○	×	○	○
55	×	○	○	×	○	○
56	○	○	○	×	○	○
57	×	×	×	○	○	○
58	○	×	×	○	○	○
59	×	○	×	○	○	○
60	○	○	×	○	○	○
61	×	×	○	○	○	○
62	○	×	○	○	○	○
63	×	○	○	○	○	○
64	○	○	○	○	○	○

Requirement in Service

When using this product as service part to replace the network adapter P.C. board, be sure to match the setup of the setup switch SW01 (Network address No. setup switch) on the network adapter P.C. board with the P.C. board setup before replacement.

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

12-4. Display and Operation of Main Remote Controller and Central Control Remote Controller

1. Turn on all the power supplies of the air conditioner, and then turn on power of the central control remote controller (Line 16 RBC-SXC1P, Line 64 TCB-SC641). If both power supplies are simultaneously turned on or if they are turned on reversely, the check code [97] may be temporarily displayed on the central remote controller. When settings of connecting cables and central control address are correct, the connected air conditioner is displayed on the central control remote controller.
2. As shown in the following table, there is difference of LCD between main remote controller (RBC-AMT21) and the central control remote controller and also there are restriction and others of operation.

	Item	Contents		Cautions
		Main remote controller	Central control remote controller	
1	Air volume selection	[SPEED] [AUTO] [HH] [H] [L]	[VOL] [AUTO] [H] [M] [L]	Display of air speed selection differs.
		[SPEED] [HH]	[VOL] [FIX]	In duct type Air speed becomes [H] and [FIX].
2	Air speed selection in FAN mode	[SPEED] [HH] [H] [L]	[VOL] [AUTO] [H] [M] [L]	When handling main remote controller, [AUTO] is not displayed. If [AUTO] is selected at center side, [AUTO] is displayed on the main remote controller. In this time, the air speed becomes [HH].
3	Air speed selection in DRY mode	[SPEED] [AUTO] [HH] [H] [L]	[VOL] [AUTO]	On the central remote controller, only [AUTO] is displayed. The display on the main remote controller changes to [AUTO] by changing the setup temperature/louver, and the air speed is automatically selected.
4	Air direction adjustment	[SWING] and air direction adjustment	[LOUVER]	On the central remote controller, only [LOUVER] is displayed. It is displayed while flap is swinging, and the setup operation of [LOUVER] becomes selection of swing ON/OFF. To set up the air direction, use the main remote controller.
		(No display)	Manual operation for [LOUVER]	In a model type without air direction adjustment
5	Check button	Test run (4 seconds)	Check code display and check reset (3 seconds)	The function of long-pushing operation for the check button differs. If the check reset operation on the central remote controller is performed during operation of air conditioner, the operation stops once, and then the operation restarts. (Error of air conditioner is cleared.)
6	Check code	3-digits display (alpha-bet + 2-digits numeral)	2-digits display (alpha-bet or numeral)	Display of check code differs. Ex. : Float switch operation Main side: [P10] Center side: [0b]

3. When using the remote controller together with the former one (RBC-AM1, AT1), the display on the main remote controller differs if [Last-push priority/Center/Operation Prohibited] is selected from the central control remote controller.

	Item	Contents		Remarks
		New remote controller (RBC-AMT21)	Former remote controller (RBC-AM1, AT1)	
1	Last-push priority	(No display)	(No display)	All the settings and ON/OFF operations are available.
2	Center	[CENTER] goes on	[CENTER] goes on	The setup contents on the central control remote controller are fixed, and only ON/OFF operation and timer setup operation are available on the main remote controller.
3	Operation prohib-ited		[CENTER] flashes	The setup contents on the central control remote controller are fixed, and the air conditioner stops. Operation from the main remote controller is unavailable.

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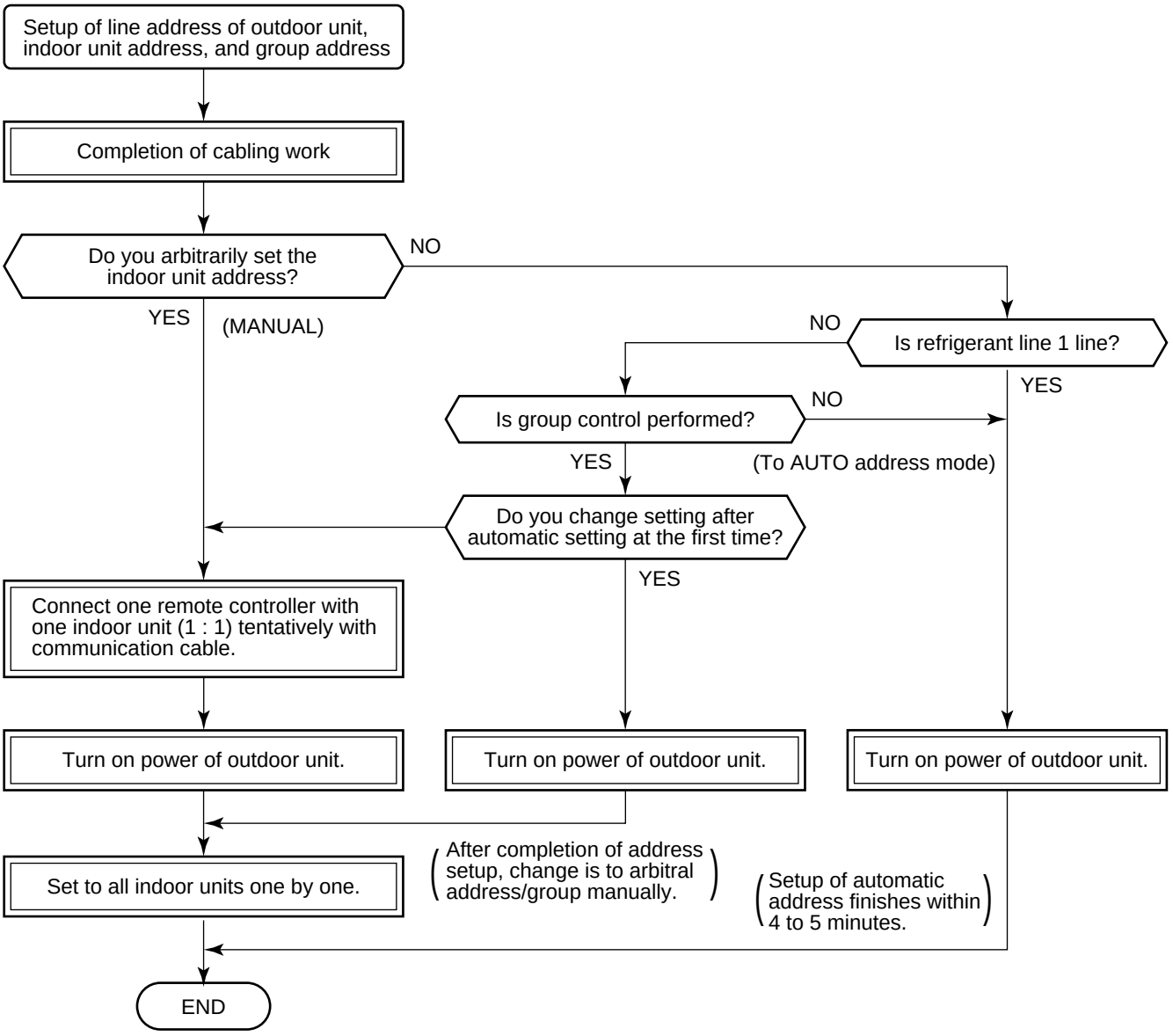
13. ADDRESS SETUP

13-1. Address Setup

<Address setup procedure>

When an outdoor unit and an indoor unit are connected, or when an outdoor unit is connected to each indoor unit respectively in the group operation even if multiple refrigerant lines are provided, the automatic address setup completes with power-ON of the outdoor unit. The operation of the remote controller is not accepted while automatic address works. (Approx. 4 to 5 minutes)


Setup of line address of outdoor unit, indoor unit address, and group address
Completion of cabling work
Do you arbitrarily set the indoor unit address?
NO
YES
(MANUAL)
NO
Is refrigerant line 1 line?
YES
Is group control performed?
NO
YES
(To AUTO address mode)
Do you change setting after automatic setting at the first time?
YES
Connect one remote controller with one indoor unit (1 : 1) tentatively with communication cable.
Turn on power of outdoor unit.
Turn on power of outdoor unit.
Turn on power of outdoor unit.
Set to all indoor units one by one.
After completion of address setup, change is to arbitral address/group manually.
Setup of automatic address finishes within 4 to 5 minutes.
END

- When the following addresses are not stored in the neutral memory (IC10) on the indoor P.C. board, a test run operation cannot be performed. (Unfixed data at shipment from factory)

	Item code	Data at shipment	Setup data range
Line address	12	0099	0001 (No. 1 unit) to 0030 (No. 30 unit)
Indoor unit address	13	0099	0001 (No. 1 unit) to 0030 (No. 30 unit) Max. value of indoor units in the identical refrigerant line (Double twin = 4)
Group address	14	0099	0000 : Individual (Indoor units which are not controlled in a group) 0001 : Master unit (1 indoor unit in group control) 0002 : Sub unit (Indoor units other than master unit in group control)

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13-2. Address Setup & Group Control

<Terminology>

Indoor unit No. : N - n = Outdoor unit line address N (Max. 30) - Indoor unit address n (Max. 64)

Group address : 0 = Individual (Not group control)
1 = Master unit in group control
2 = Sub unit in group control

Master unit (= 1) : The representative of multiple indoor units in group operation sends/receives signals to/from the remote controllers and sub indoor units. (* It has no relation with an indoor unit which communicates serially with the outdoor units.)

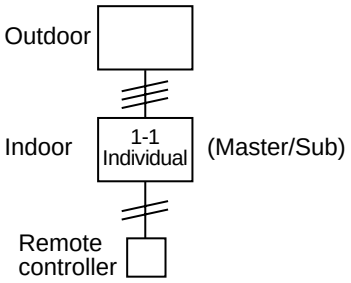
The operation mode and setup temperature range are displayed on the remote controller LCD. (Except sir direction adjustment of flap)

Sub unit (= 2) : Indoor units other than master unit in group operation

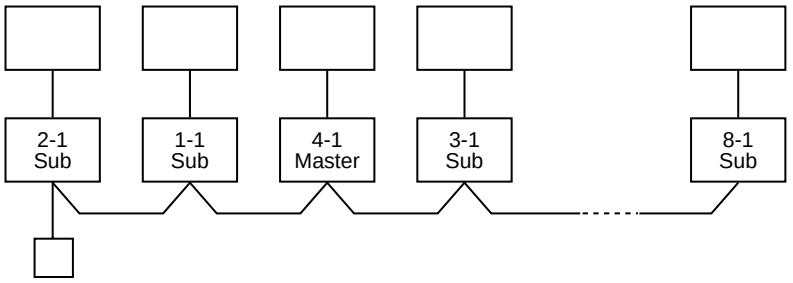
Basically, sub units do not send/receive signals to/from the remote controllers.
(Except errors and response to demand of service data)

13-2-1. System configuration

1. Single



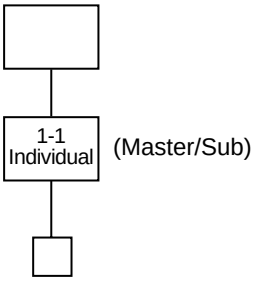
2. Single group operation



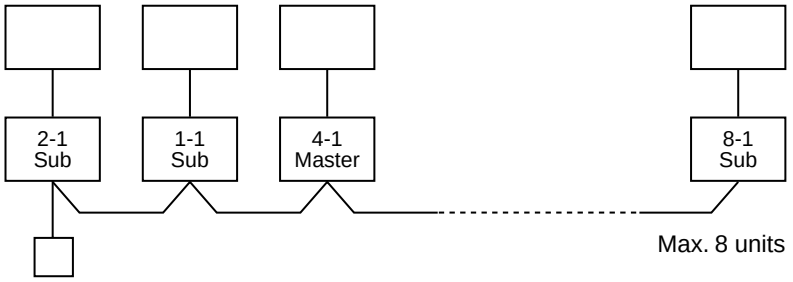
13-2-2. Automatic address example from unset address (No miscabling)

1. Standard (One outdoor unit)

1) Single



2) Gr operation
(Multiple outdoor units = Miltiple indoor units only with serial communication)



Only turning on source power supply (Automatic completion)

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13-3. Address Setup

In case that addresses of the indoor units will be determined prior to piping work after cabling work

(Manual setting from remote controller)

<Address setup procedure>

- Set an indoor unit per a remote controller.
- Turn on power supply.

1 **Push SET + CL + ⌐ buttons simultaneously for 4 seconds or more.**

2 **(← Line address) Using the temperature setup ▲ / ▼ buttons, set *12* to the item code.**

3 **Using timer time ▲ / ▼ buttons, set the line address.**

4 **Push SET button.** (OK when display goes on.)

5 **(← Indoor unit address) Using the temperature setup ▲ / ▼ buttons, set *13* to the item code.**

6 **Using timer time ▲ / ▼ buttons, set 1 to the line address.**

7 **Push SET button.** (OK when display goes on.)

8 **(← Group address) Using the temperature setup ▲ / ▼ buttons, set *14* to the item code.**

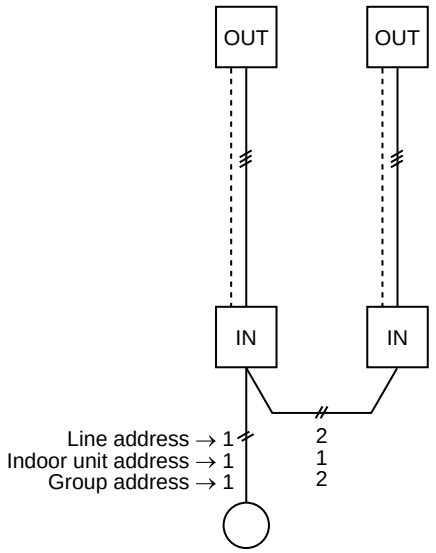
9 **Using timer time ▲ / ▼ buttons, set *0000* to Individual, *0001* to Master unit, and *0002* to sub unit.**

10 **Push SET button.** (OK when display goes on.)

11 **Push ⌐ button.**

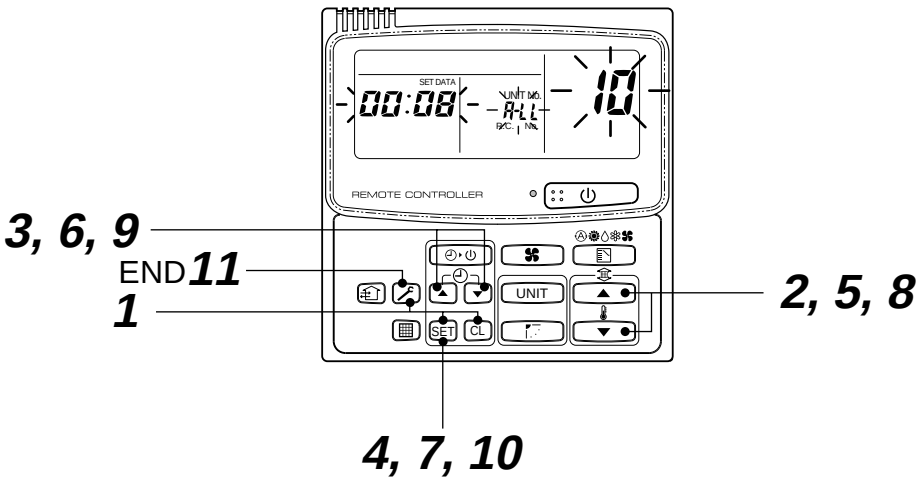
Setup completes.
(The status returns to the usual stop status.)

(Example of 2-lines cabling)
(Real line: Cabling, Broken line: Refrigerant pipe)



For the above example, perform setting by connecting singly the wired remote controller without remote controller inter-unit cable.

Group address
Individual : 0000
Master unit : 0001
Sub unit : 0002
} In case of group control



<Operation procedure>

1→ 2→ 3→ 4→ 5→ 6→ 7→ 8→ 9→ 10→ 11 END

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■ Confirmation of indoor unit No. position

1. To know the indoor unit addresses though position of the indoor unit body is recognized

- In case of individual operation (Wired remote controller : indoor unit = 1 : 1)
  (Follow to the procedure during operation)

<Procedure>

1 **Push (ON/OFF) button if the unit stops.**

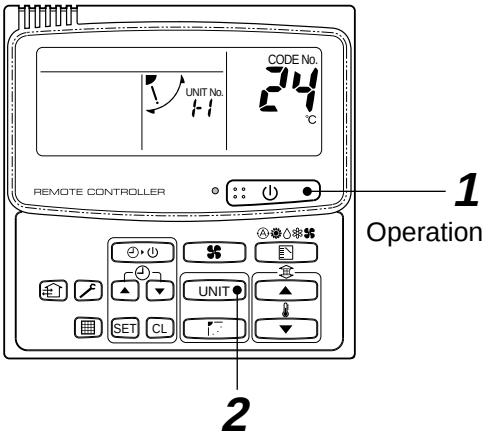
2 **Push (UNIT) button.**

Unit No. 1-1 is displayed on LCD.

(It disappears after several seconds.)

The displayed unit No. indicate line address and indoor unit address.

(When other indoor units are connected to the identical remote controller (Group control unit), other unit numbers are also displayed every pushing (UNIT) button.



<Operation procedure>

1 → ***2*** END

2. To know the position of indoor unit body by address

- To confirm the unit No. in the group control
  (Follow to the procedure during operation) (in this procedure, the indoor units in group control stop.)

<Procedure>

The indoor unit numbers in the group control are successively displayed, and fan, flap, and drain pump of the corresponding indoor unit are turned on. (Follow to the procedure during operation)

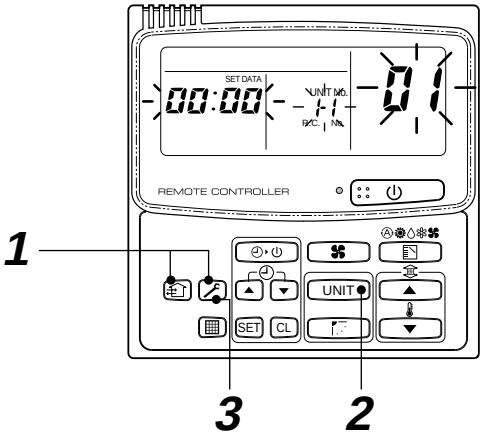
1 **Push (TEMP) and (TIME) buttons simultaneously for 4 seconds or more.**

- Unit No. ALL is displayed.
- Fans and flaps of all the indoor units in the group control operate.

2 **Every pushing (UNIT) button, the unit numbers in the group control are successively displayed.**

- The unit No. displayed at the first time indicates the master unit address.
- Fan and flap of the selected indoor unit only operate.

3 **Push (TIME) button to finish the procedure. All the indoor units in the group control stop.**



<Operation procedure>

1 → ***2*** → ***3*** END

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RAV-SM800AT-E LED display when SW800 : Bit 1, 2, 3, 4 OFF

RAV-SM560UT-E, RAV-SM560BT-E, RAV-SM560AT-E
RAV-SM800UT-E, RAV-SM800BT-E, RAV-SM800AT-E (A02-014)

- When multiple errors are detected, the latest error is displayed.
- While LED displays ○ (go on), there is the main cause of error in control at CDB side and it stops abnormally.
- While LED displays ◎ (flash), there is the main cause of error in control at IPDU side and it stops abnormally.
- For an error in case thermo operation, the communication is interrupted on the serial circuit. If continuing the case thermo operation, serial sending to the indoor unit is interrupted and a serial communication error is output.

Table A

	No.	Item	Check code	LED display			
			B type	D800 (Red)	D801 (Yellow)	D802 (Yellow)	D803 (Yellow)
CDB side	1	TE sensor error	18	○	●	●	●
	2	TD sensor error	19	○	○	●	●
	3	TS sensor error	18	●	●	○	●
	4	TO sensor error	1B	●	○	●	●
	5	Discharge temp error	1E	●	○	○	●
	6	Out DC fan error	1A	○	○	○	●
	7	Communication error between IPDU (Abnormal stop)	1C	○	●	●	○
	8	High-pressure release operation	21	●	○	●	○
			—				
	9	EEPROM error	—	○	○	●	○
	10	Communication error between IPDU (No abnormal stop)	—	●	●	○	○
IPDU side	11	G-Tr short-circuit protection	14	◎	●	●	●
	12	Detection circuit error	16	●	◎	●	●
	13	Current sensor error	17	◎	◎	●	●
	14	Phase missing detection	17	●	●	●	◎
	15	Comp lock error	1D	●	●	◎	●
	16	Comp breakdown	1F	◎	●	◎	●

○ : Go on, ● : Go off, ◎ : Flash (5 Hz)

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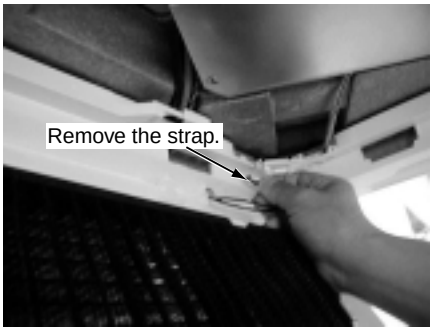
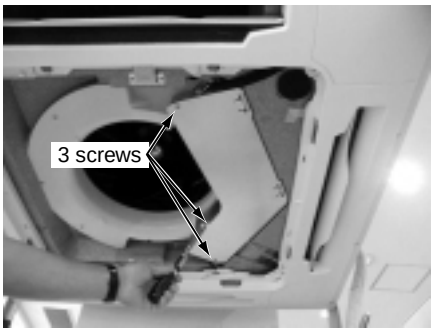
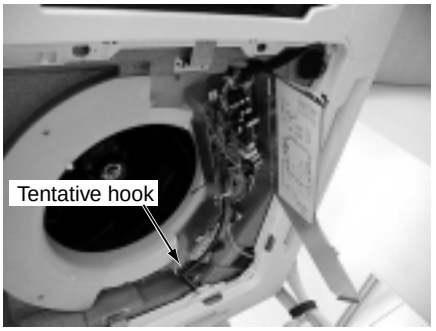
14. DETACHMENTS

14-1. Indoor Unit

14-1-1. 4-Way Air Discharge Cassette Type

RAV-SM560UT-E, RAV-SM800UT-E, RAV-SM1100UT-E, RAV-SM1400UT-E (A02-014, A03-003)
RAV-SP1100UT-E (A03-014)

No.	Part name	Procedure	Remarks
①	Suction grille	**REQUIREMENT** Never forget to put on the gloves at disassembling work, otherwise an injury will be caused. **1. Detachment** 1) Stop operation of the air conditioner, and then turn off switch of the breaker. 2) Hang down the suction grille while sliding two knobs of the suction grille inward. 3) Remove a strap connecting the panel and the suction grille to remove the suction grille. **2. Attachment** 1) Hang the suction grille to the panel. 2) Attach the strap of the suction grille to the panel as before. 3) Close the suction grille, slide the knobs outward, and then fix it.	 
②	Electric parts cover	**1. Detachment** 1) Perform work of item 1. of ①. 2) Remove screws fixing the electric parts cover. (Ø4 x 10, 3 pcs.) 3) Remove the electric parts cover from the tentative hook, and then open the cover. **2. Attachment** 1) Close the electric parts cover and hang the cover hole to the tentative hook. 2) Tighten the fixing screws. (Ø4 x 10, 3 pcs.)	 

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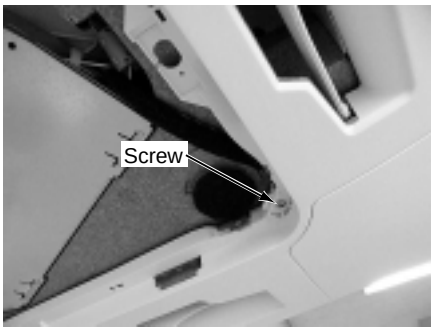
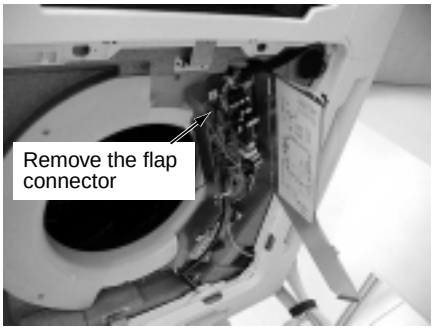
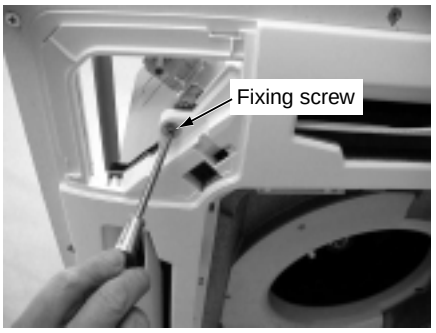
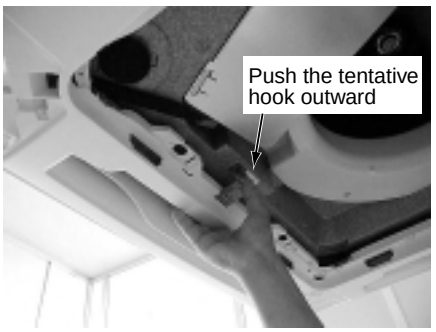
No.	Part name	Procedure	Remarks
③	Adjust corner cap	**1. Detachment** 1) Perform work of item 1. of ①. 2) Remove screws at 4 corners of the suction port. (Ø4 x 10, 4 pcs.) 3) Push the knob outward and remove the adjust corner cap by sliding it. **2. Attachment** 1) Mount the adjust corner cap by sliding it inward. 2) Tighten screws at 4 corners of the suction port. (Ø4 x 10, 4 pcs.)	
④	Ceiling panel	**1. Detachment** 1) Perform works of items 1 of ①, 1 of ② and 1 of ③. 2) Remove the flap connector (CN33, White, 5P) connected to the control P.C. board, and then remove the lead wire from the clamp. **NOTE :** Remove the connector by releasing locking of the housing. 3) Remove screws fixing the ceiling panel. (M5, 4 pcs.) 4) Push the tentative hook outward to remove the ceiling panel. **2. Attachment** 1) Hang the tentative hook of the main body drain pan to the tentative hook of the ceiling panel. **NOTE :** A panel has directional property, so mount a panel with attention to the marks. 2) Tighten fixing screws. (M5, 4 pcs.) 3) Connect flap connector of the ceiling panel to connector (CN33, White, 5P) on the control P.C. board.	  

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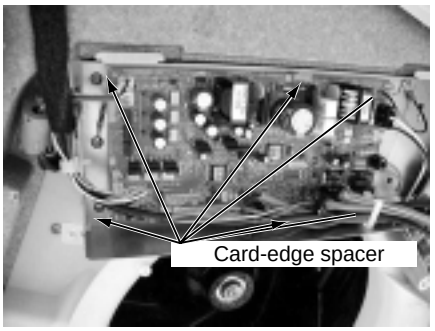
No.	Part name	Procedure	Remarks
⑤	Control P.C. board	**1. Detachment** 1) Perform works of items 1 of ① and 1 of ②. 2) Remove connectors which are connected from the control P.C. board to other parts. CN33 : Flap motor (5P: White) CN34 : Float switch (3P: Red) CN41 : Terminal block of remote controller (3P: Blue) CN68 : Drain pump (3P: Blue) CN67 : Terminal block of power supply (5P: Black) CN101 : TC sensor (2P: Black) CN102 : TCJ sensor (2P: Red) CN104 : Room temperature sensor (2P: Yellow) CN333 : Power supply of fan motor (5P: White) CN334 : Position detection of fan motor (5P: White) **NOTE :** Remove the connector by releasing locking of the housing. 3) Unlock locking of the card-edge spacer at 6 positions to remove the control P.C. board. **2. Attachment** 1) Fix the control P.C. board to the card-edge spacer at 6 positions. 2) Connect the connectors removed in item 1 to the original positions.	

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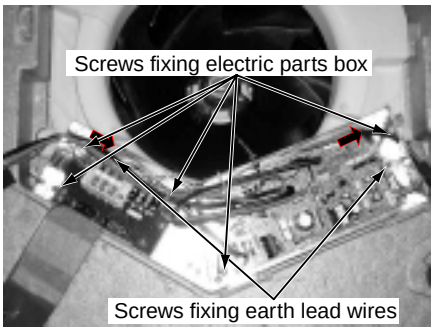
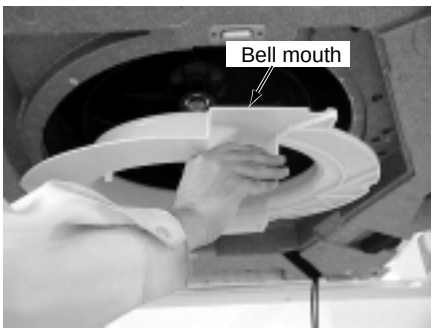
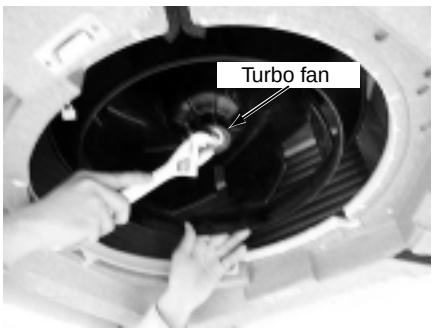
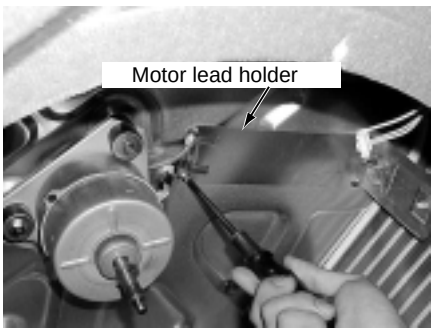
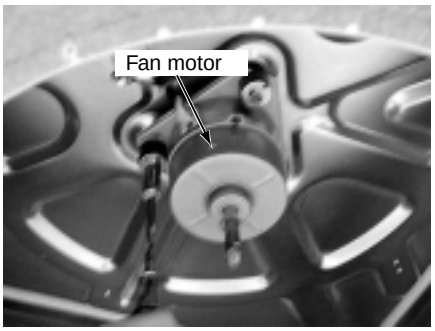
No.	Part name	Procedure	Remarks
⑥	Fan motor	**1. Detachment** 1) Perform works of items 1 of ① and 1 of ②. 2) Remove clamps of the lead wires connected to the following connectors of the control P.C. board. CN33 : Flap motor (5P: White) CN34 : Float switch (3P: Red) CN68 : Drain pump (3P: Blue) CN101 : TC sensor (2P: Black) CN102 : TCJ sensor (2P: Red) CN333 : Power supply of fan motor (5P: White) CN334 : Position detection of fan motor (5P: White) **NOTE :** Remove the connector by releasing locking of the housing. 3) Remove screws fixing earth lead wire in the electric parts box. (Ø4 x 6, 2 pcs.) 4) Remove indoor/outdoor inter-unit cable and remote controller cable of the terminal block. 5) Remove screws fixing the electric parts box. (Ø4 x 10, 5 pcs.) 6) Remove screws fixing the bell mouth. (Ø4 x 10, 6 pcs.) 7) Remove nuts fixing the turbo fan. (M6, 1 pc.) 8) Remove screws fixing holder of the motor lead wires to remove the motor lead wires from the clamp. (Ø4 x 8, 3 pcs.) 9) Remove nuts fixing the fan motor to remove it. **2. Attachment** 1) Fix the parts, fan motor, holder of the motor lead, turbo fan, bell mouth, and electric parts box successively to their original positions. **NOTE 1 :** When fixing the turbo fan, be sure to match the fan boss with D-cut of the motor shaft. **NOTE 2 :** Fix the turbo fan with torque wrench 5.9 ± 0.6Nm. 2) Connect connectors, earth lead wire, indoor/outdoor inter-unit cable, and remote controller cable which have been disconnected in the above item 1 as before.	    

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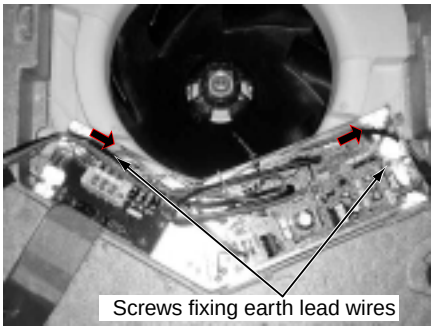
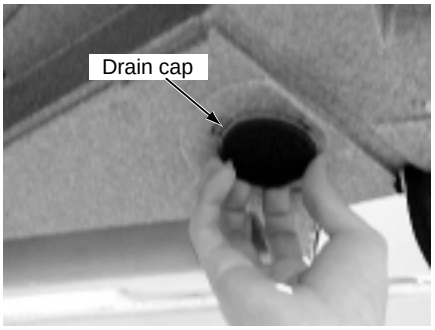
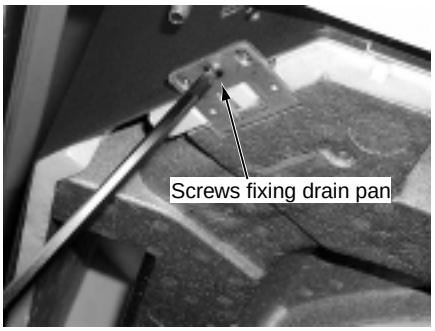
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
⑦	Drain pan	**1. Detachment** 1) Perform works of items 1 of ①, 1 of ②, 1 of ③ and 1 of ④. 2) Remove clamps of the lead wires connected to the following connectors of the control P.C. board. CN34 : Float switch (3P: Red) CN68 : Drain pump (3P: Blue) CN101 : TC sensor (2P: Black) CN102 : TCJ sensor (2P: Red) CN333 : Power supply of fan motor (5P: White) CN334 : Position detection of fan motor (5P: White) **NOTE :** Remove the connector by releasing locking of the housing. 3) Remove screws fixing earth lead wire in the electric parts box. (Ø4 x 6, 2 pcs.) 4) Remove indoor/outdoor inter-unit cable and remote controller cable of the terminal block. 5) Remove screws fixing the electric parts box. (Ø4 x 10, 5 pcs.) 6) Remove screws fixing the bell mouth. (Ø4 x 10, 6 pcs.) 7) Remove the drain cap, and drain water accumulated in the drain pan. **NOTE 1 :** When removing the drain cap, be sure to prepare a bucket to catch the drained water. **NOTE 2 :** Thermal insulator is adhered to the drain cap. Be careful not to peel off the insulator. If the insulator has been peeled, adhere it with double-face tape, etc. as before. 8) Remove screws fixing the drain pan. (Ø4 x 8, 4 pcs.) **2. Attachment** 1) Fix the parts, drain cap, drain pan, bell mouth, and electric parts box successively to their original positions. 2) Connect connectors, earth lead wire, indoor/outdoor inter-unit cable, and remote controller cable which have been disconnected in the above item 1 as before.	  

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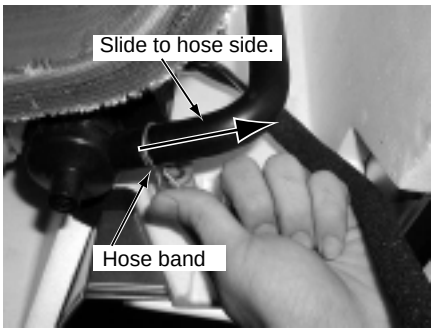
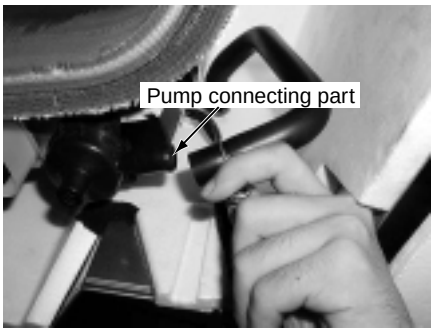
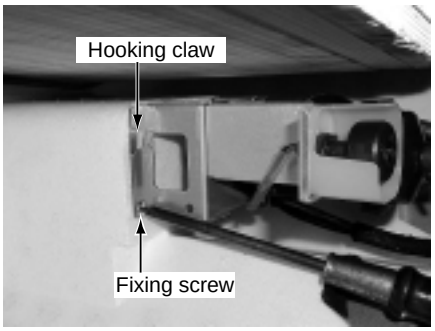
No.	Part name	Procedure	Remarks
⑧	Drain pump assembly	**1. Detachment** 1) Perform works of items 1 of ①, 1 of ②, 1 of ③, 1 of ④ and 1 of ⑦. 2) Picking the hose band, slide it from pump connecting part to remove the drain hose. 3) Remove screw fixing the drain pump assembly, slide hooking claws of the drain pump assembly and the main body (1 position), and then remove the assembly. (Ø4 x 8, 3 pcs.) **3. Attachment** 1) Fix the drain pump assembly as before. **NOTE :** The drain pump is fixed with a hook and 3 screws. In screwing, be sure that screws do not to run on hooking claw at the main body side. 2) Attach the drain hose and hose band as before. **NOTE :** Insert the drain hose up to the end of pump connecting part, and bind the white mark position of the hose with band.	  

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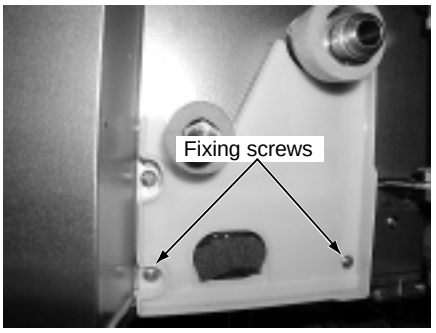
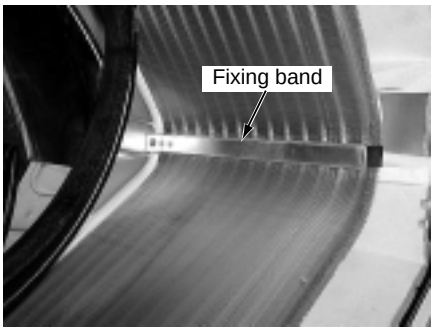
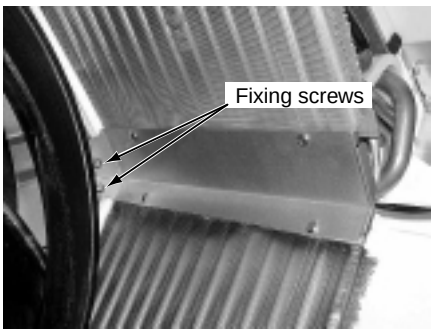
No.	Part name	Procedure	Remarks
⑨	Heat exchanger	**1. Detachment** 1) Recover refrigerant gas. 2) Remove refrigerant pipe at the indoor unit side. 3) Perform works of items 1 of ①, 1 of ②, 1 of ③, 1 of ④ and 1 of ⑦. 4) Remove screws fixing the pipe cover. (Ø4 x 8, 2 pcs.) 5) Remove the heat exchanger by removing fixing band and fixing screws while holding the heat exchanger. (Ø4 x 8, 3 pcs.) **2. Attachment** 1) Fix the parts, heat exchanger, fixing band, pipe cover, drain cap, drain pan, bell mouth, and electric parts box successively to their original positions. 2) Connect connectors, earth lead wire, indoor/outdoor inter-unit cable, and remote controller cable which have been disconnected in the above item 1 as before. 3) Connect the refrigerant pipe as before, and then perform vacuuming.	  

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

<Replacement of Distributor Assembly>

RAV-SM560UT-E (A02-014))

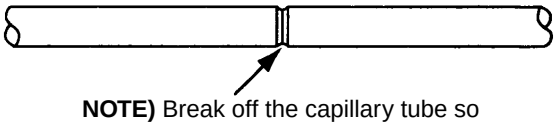
1. Cutting of Capillary Tube

A capillary tube (023 : Inner diameter 2mm, Length 1000mm) is brazed to a distributor assembly. Cut and divide the tube to each length as shown below.

Ref No.	No. of capillary tubes	Cutting
023	4	200 mm : 2 pcs. 400 mm : 2 pcs.

[Cutting]

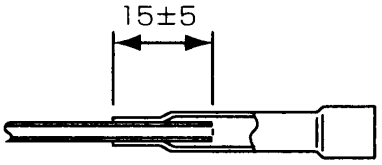
Plane circumference of the capillary tube with triangle file, etc., and then break off it.



NOTE) Break off the capillary tube so that inner diameter is not deformed

2. Attachment of joint pipe

Insert the attached joint pipe into the end of the capillary tube up to 15mm, and braze it.

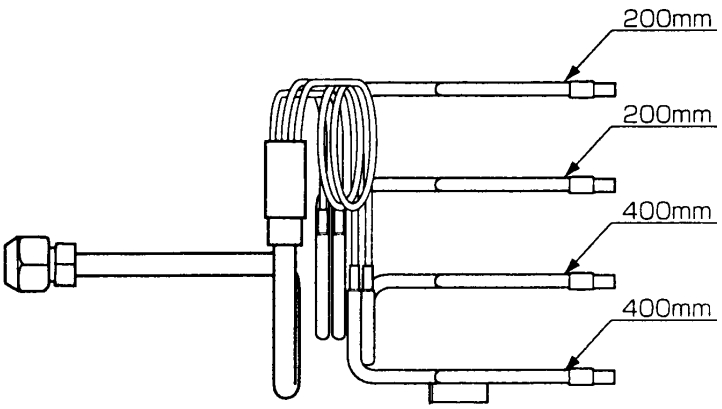


Form the capillary tube as same as that in the distributor assembly before replacement.

3. Brazing to indoor heat exchanger

Attach the capillary tube processed in items 1 and 2 to the end of the pipe with brazing as shown below.

023



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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM800UT-E (A02-014)

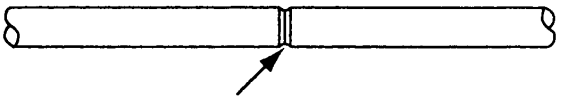
1. Cutting of Capillary Tube

A capillary tube (025) (026) : Inner diameter 2mm, Length 1000mm) is brazed to a distributor assembly. Cut and divide the tube to each length as shown below.

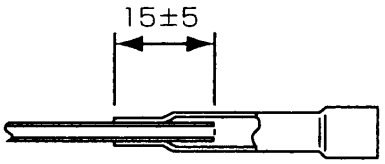
Ref No.	No. of capillary tubes	Cutting
025	7	100 mm : 1 pc. 300 mm : 1 pc. 400 mm : 1 pc. 600 mm : 2 pcs. 700 mm : 1 pc. 800 mm : 1 pc.
026	10	100 mm : 2 pcs. 150 mm : 1 pc. 500 mm : 4 pcs. 600 mm : 2 pcs. 900 mm : 1 pc.

[Cutting]

Plane circumference of the capillary tube with triangle file, etc., and then break off it.



NOTE) Break off the capillary tube so that inner diameter is not deformed



2. Attachment of joint pipe

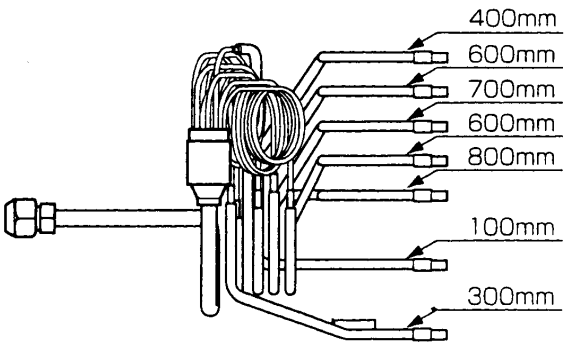
Insert the attached joint pipe into the end of the capillary tube up to 15mm, and braze it.

Form the capillary tube as same as that in the distributor assembly before replacement.

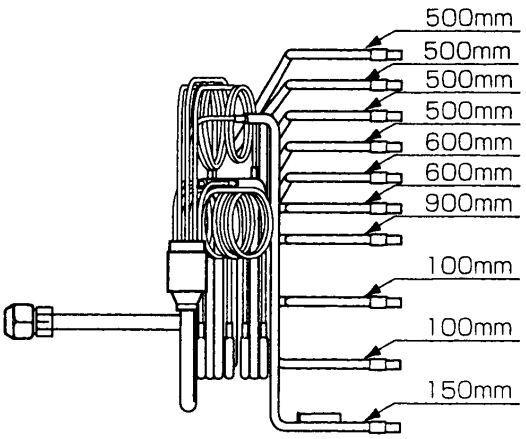
3. Brazing to indoor heat exchanger

Attach the capillary tube processed in items 1 and 2 to the end of the pipe with brazing as shown below.

025



026



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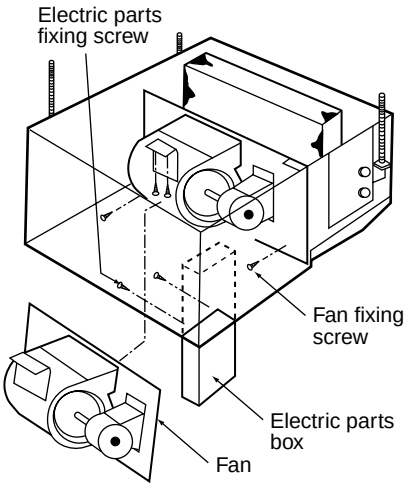
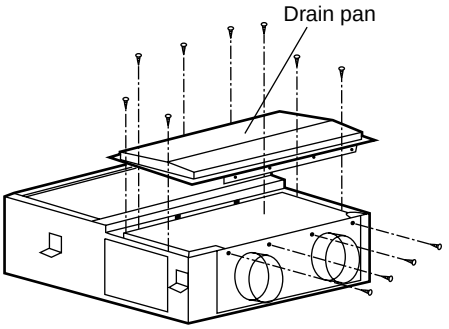
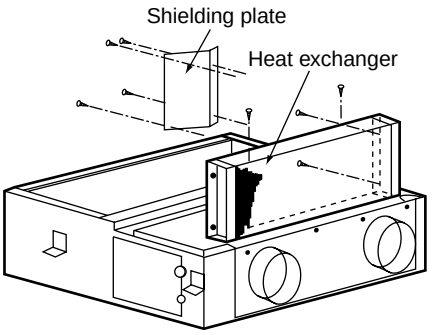
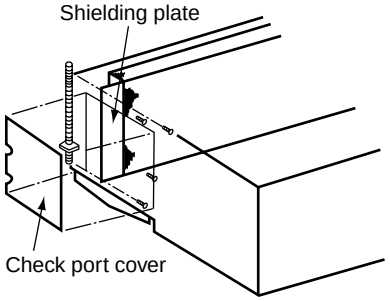
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

14-1-2. Built-in Type

RAV-SM560BT-E, SM800BT-E (A02-014)

Be sure to turn off the power supply before disassembling work.

No.	Item	Procedure	
1	Electric parts box	1) Remove the electric parts box. (Supplement: Refer to How to remove the electric parts box.) In this time, remove connectors of TA sensor, TC sensor, and TCJ sensor, if necessary.)	
2	Fan	1) Remove connector of the fan motor. 2) Remove screws fixing the fan. (Screws at 4 positions) 3) Take off jointed portion of fan and cabinet, and then put down the fan. 4) Loosen set screw of the Silocco fan. 5) Remove set screw of the fan case. 6) Remove the fan motor mounting metal, and then replace the fan motor.	
3	Drain pan	1) Take down the indoor unit and then treat the drain pan on the floor. 2) Remove screws fixing the drain pan (12 positions) and then replace the drain pan.	
4	Heat exchanger	1) Take down the indoor unit and then treat the heat exchanger on the floor. 2) Remove screws fixing the drain pan (12 positions) and then remove the drain pan. 3) Remove the shielding plate. (Screws at 4 positions) 4) Remove screws (at 4 positions) fixing the heat exchanger, and then replace the heat exchanger.	
5	TC sensor (Sensor side)	1) Remove the check port cover. 2) Remove the shielding plate. (At 4 positions) 3) Pull out the sensors inserted into pipe of the heat exchanger.	

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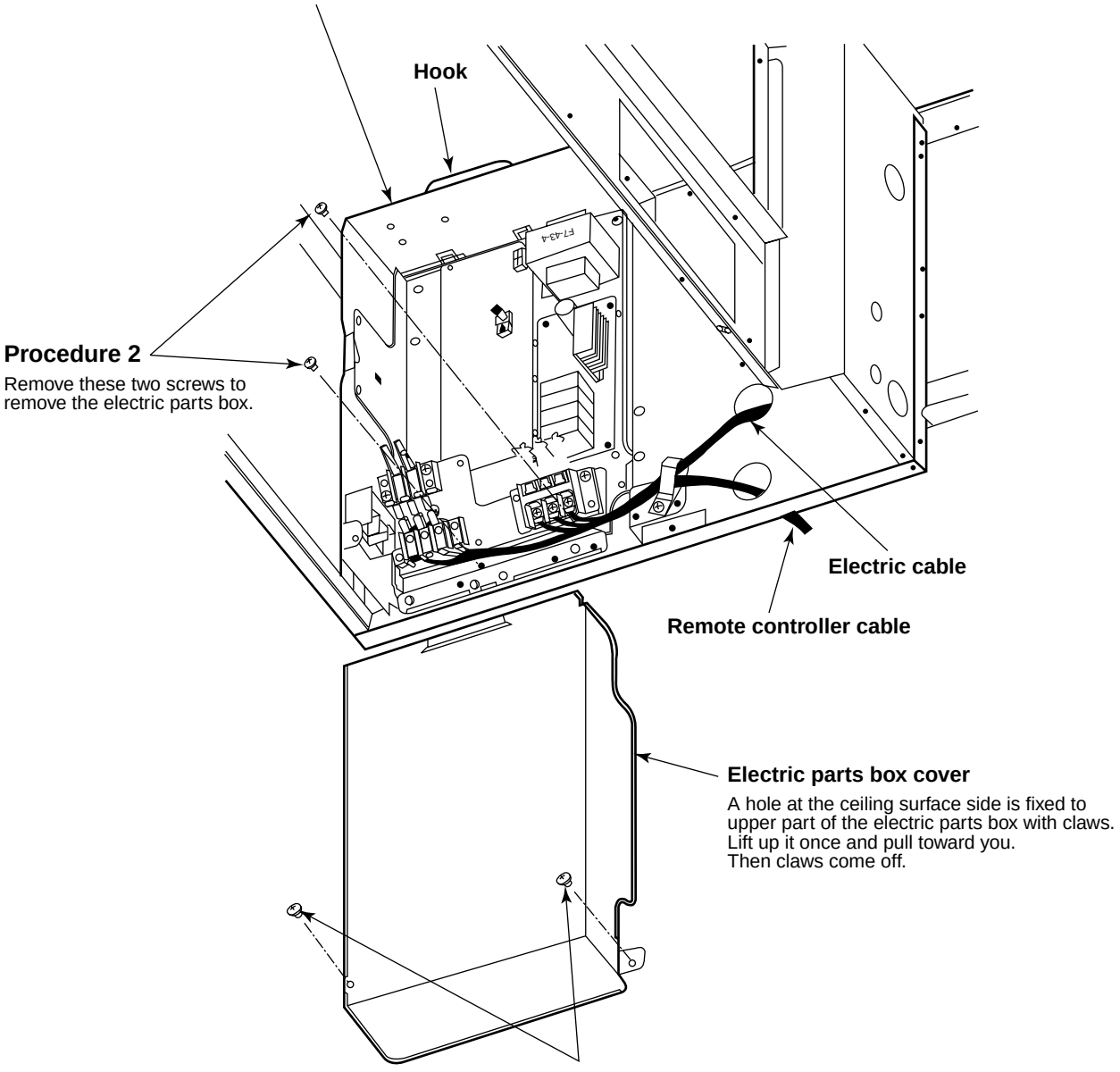
[SUPPLEMENT] How to remove the electric parts box

Electric parts box

The electric parts box is fixed to the indoor unit with claws at the rear side.
Lift up it once and pull toward you. Then claws come off.


Hook
Procedure 2
Remove these two screws to remove the electric parts box.
Electric cable
Remote controller cable
Electric parts box cover
A hole at the ceiling surface side is fixed to upper part of the electric parts box with claws. Lift up it once and pull toward you. Then claws come off.
Procedure 1
Remove these two screws to remove the electric parts box cover.

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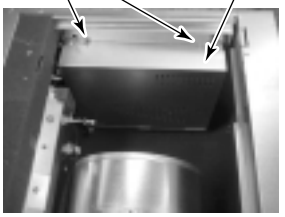
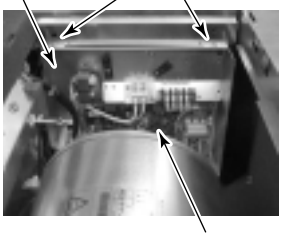
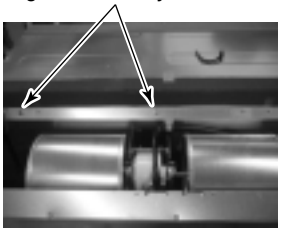
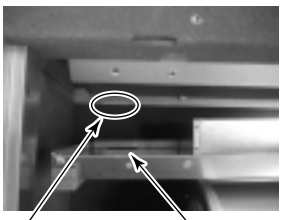
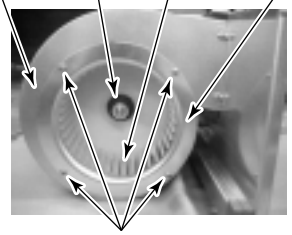
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

14-1-3. Concealed Duct Type

RAV-SM561BT-E, RAV-SM801BT-E, RAV-SM1101BT-E, RAV-SM1401BT-E (A03-007)

Be sure to turn off the power supply or circuit breaker before disassembling work

No.	Part name	Procedure	Remarks
①	Electrical parts box	1. Remove the air filter. 2. Remove the set screws (2 positions) of the electrical parts cover. 3. Remove the electrical parts cover. 4. Remove the set screws (2 positions) of the electrical parts box. 5. Remove the electrical parts box. The electrical parts box is fixed to the main unit with claws at the right side. Lift up it once and pull toward you. Then claws come off. In this time, remove connectors of TA sensor, TC sensor and TCJ sensor if necessary.	Screws (Fixing electrical parts cover and box) Electrical parts cover  ①-2 ①-3 Screws (Fixing electrical parts box and main unit) Electrical parts box  ①-4 ①-5 Claw (Reverse side)
②	Multi blade fan	1. Remove the air filter. 2. Remove the connector of the fan motor P.C. board. 3. Remove the hexagon head screw (561: 2, 801, 1101, 1401 : 3 positions) of fixing fan assembly and main unit. 4. Remove the fan assembly from main unit. The fan assembly is fixed to the main unit with claws (3 positions) at the upper side. Lift up it once and pull toward rear side. Then claws come off. 5. Remove the set screws (4 positions) of fixing fan case and fan cover. 6. Remove the fan cover. 7. Loosen the sets crew of the Multi blade fan using hexagon wrench. 8. Pull the Multi blade fan towered fan case side. Then fans come off.	Hexagon head screws (Fixing fan assembly and main unit)  ②-3  ②-4 Fixing claw (Main unit) Fixing hole (Fan assembly) Fan case Multi blade fan Set screw Fan case cover  ②-5 ②-6 Screws (Fixing fan case cover)

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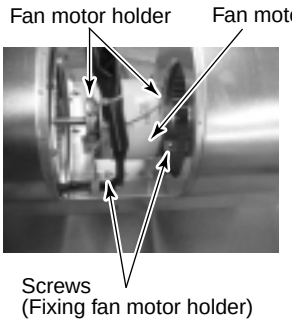
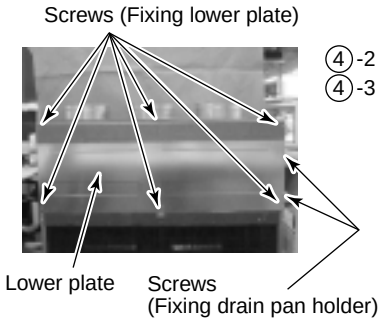
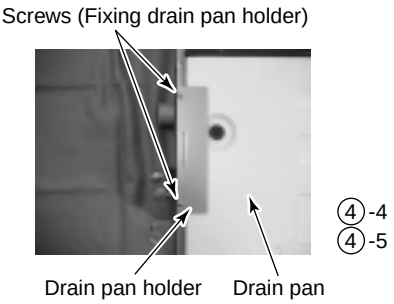
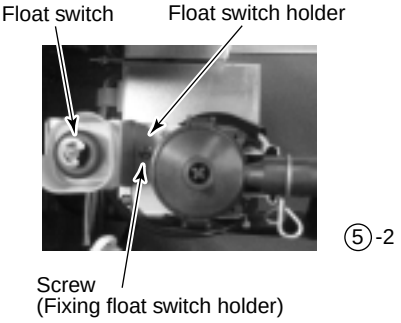
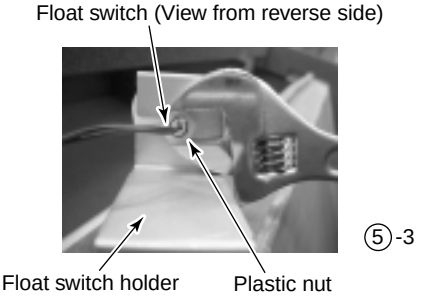
No.	Part name	Procedure	Remarks
③	Fan motor	1. Remove the Multi blade fan. 2. Remove the hexagon head screw of fixing fan motor holder. 3. Remove the fan motor holder (2 positions).	
④	Drain pan	1. Take down the main unit and then treat the drain pan on the floor. 2. Remove the set screws (561 : 7, 801, 1101, 1401 : 9 positions) of fixing lower plate. 3. Remove the lower plate from main unit. 4. Remove the set screws (561 : Nothing, 801 : 2 positions, 1101, 1401 : 4 positions) of fixing drain pan holder and main unit. 5. Remove the drain pan holder (561 : Nothing, 801 : 1 position, 1101, 1401 : 2 positions) from main unit. 6. Remove the drain pan. Pull it lower side.	 
⑤	Float switch	1. Remove the drain pan. 2. Remove the set screw (1 position) of fixing float switch holder. 3. Remove the plastics nut of foxing float switch. 4. Remove the float switch.	 

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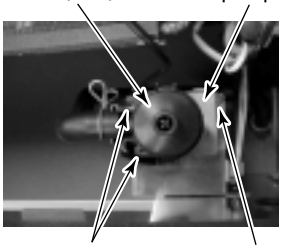
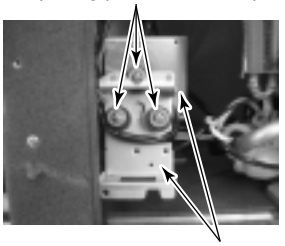
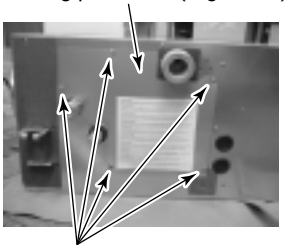
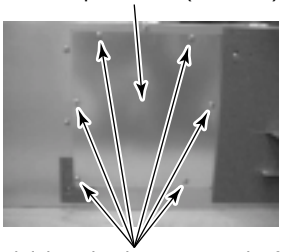
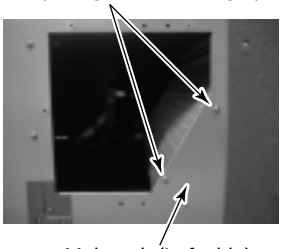
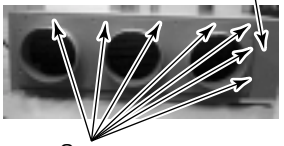
No.	Part name	Procedure	Remarks
⑥	Drain pump	1. Remove the drain pan and float switch. 2. Remove the set screws (3 positions) of fixing drain pump plate and main unit. 3. Remove the set screws (3 positions) of fixing drain pump plate and drain pump.	Drain pump Drain pump holder  ⑥-2 Screws (Fixing drain pump holder) Screws (Fixing plate and drain pump)  ⑥-3 Drain pump holder ⑥-3. View from reverse side of drain pump
⑦	TC, TCJ sensor	1. Remove the set screws (5 positions) and check port cover (right side). 2. Pull out the sensor is inserted into pipe of the heat exchanger.	Checking port cover (Right side)  ⑦-1 Screws (Fixing check port cover (Right side))
⑧	Heat exchanger	1. Take down the main unit and then treat the heat exchanger on the floor. 2. Remove the drain pan. 3. Remove the check port cover (right side). 4. Remove the set screws (6 positions) and check port cover (left side). 5. Remove the set screws (2 positions) of fixing heat exchanger and main unit (left side). 6. Remove the set screws (7 positions) of fixing heat exchanger and main unit (front right side).	Check port cover (Left side)  ⑧-4 Screws (Fixing check port cover (Left side)) Screws (Fixing heat exchanger)  ⑧-5 Main unit (Left side) Main unit (Front side)  ⑧-6 Screws

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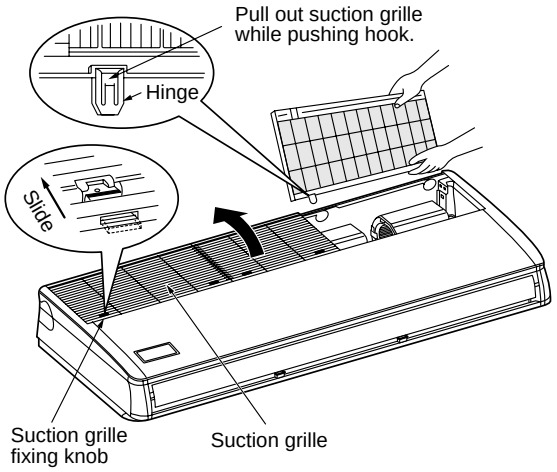
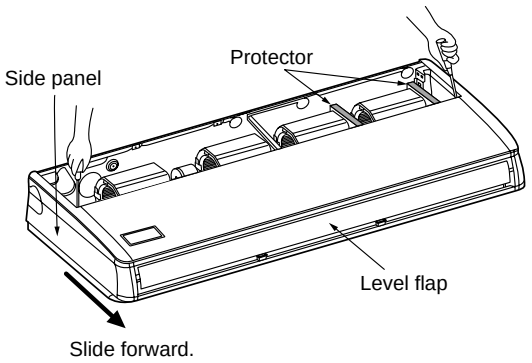
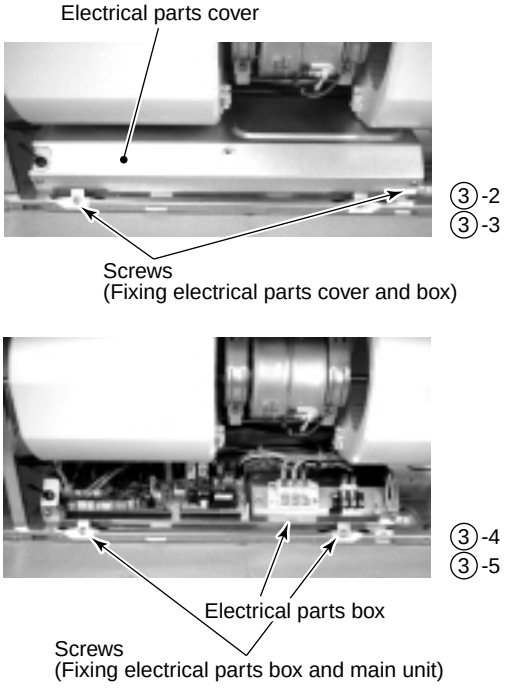
14-1-4. Under Ceiling Type

RAV-SM561CT-E, RAV-SM801CT-E, RAV-SM1101CT-E, RAV-SM1401CT-E (A03-016)

Be sure to turn off the power supply or circuit breaker before disassembling work

No.	Part name	Procedure	Remarks
①	Suction grille	1. Slide the suction grille fixing knobs (2 positions) toward the arrow direction of left figure, and open the suction grille. 2. Under the condition of the suction grille opened, push the hook section of hinges (2 positions) at the rear side, and then pull out the suction grille.	
②	Side panel	1. Open the suction grille. 2. After removing the side panel screws (2 positions), slide the side panel forward and then remove it.	
③	Electrical parts box	1. Remove the suction grille. 2. Loosen the set screws (2 positions) of the electrical parts cover. 3. Remove the electrical parts cover. 4. Remove the set screws (2 positions) of the electrical parts box. 5. Remove the electrical parts box. In this time, remove connectors of TA sensor, TC sensor and TCJ sensor if necessary.	

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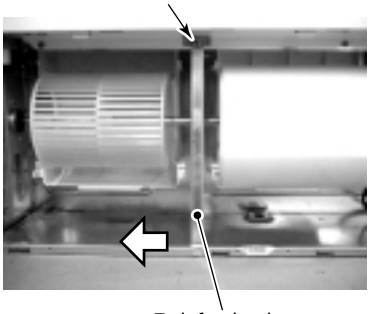
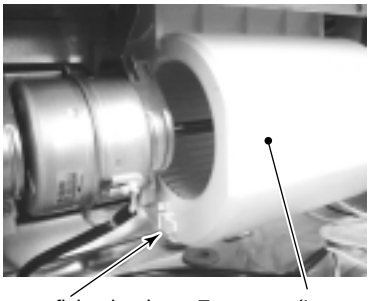
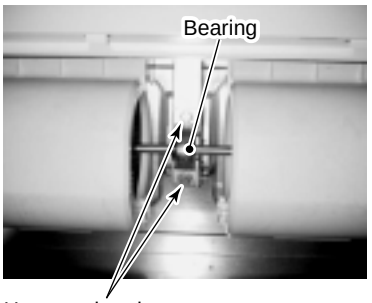
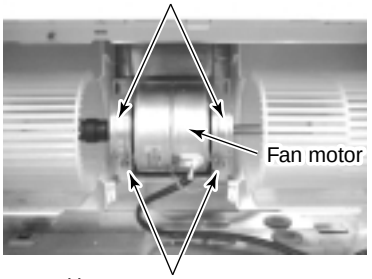
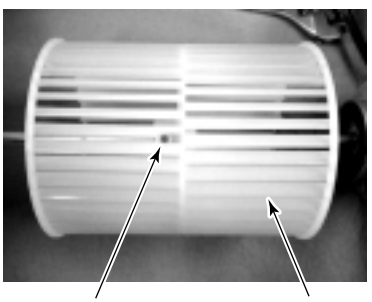
No.	Part name	Procedure	Remarks
④	Multi blade fan motor	1. Remove the suction grille. 2. Remove the connector of the fan motor from P.C. board. 3. (SM801, SM1101, SM1401CT-E only) Remove the set screw (1 position) to fixing and reinforcing bar. (Slide the reinforcing bar toward arrow side on the left figure.) 4. Push the fan cover fixing hooks (2 positions) forward fan cover side and remove the fan cover. 5. (SM1101, SM1401CT-E only) Remove the hexagon head screws (2 positions) to fix bearing and the bearing. 6. Remove the hexagon head screw of fixing fan motor and fan motor holder then the assembly removed from the main unit. 7. Loosen the sets crew of the multi blade fan using hexagon wrench. 8. Pull the multi blade fan towered fan case side. Then fans come off.	Screws (Fixing reinforcing bar and main unit)  ④-3 Reinforcing bar  ④-4 Fan cover fixing hook Fan cover (Lower side)  Bearing ④-5 Hexagon head screws (Fixing bearing and main unit) Fan motor holder  Fan motor ④-6 Hexagon screws (Fixing fan motor and main unit)  ④-7 Set screw of multi blade fan Multi blade fan

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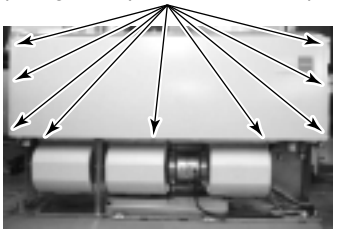
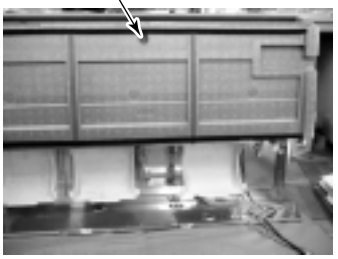
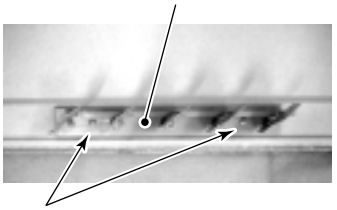
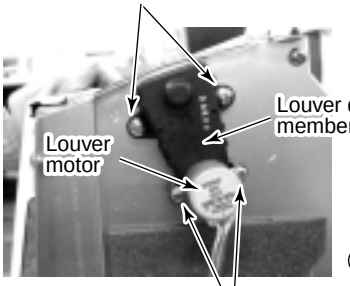
No.	Part name	Procedure	Remarks
⑤	Drain pan	1. Take down the main unit and then treat the drain pan on the floor. 2. Remove the both side panels and suction grilles. 3. (SM801, SM1101, SM1401CT-E only) Remove the set screw (1 position) to fixing and reinforcing bar. (Slide the reinforcing bar toward arrow side on the right figure.) 4. Remove the set screws (9 positions) of fixing lower plate. 5. Remove the heat insulation on the drain pan. (SM561, SM801 : 1 position, SM1101, SM1401 : 2 positions) 6. Remove the set screws (SM561, SM801 : 1 position, SM1101, SM1401 : 2 positions) of fixing drain pan and main unit. 7. Remove the drain pan. Pull it lower side.	Screws (Fixing lower plate and main unit)  ⑤-4 Heat insulation The screw that fixed drain pan and main unit is under this insulation.  ⑤-5 ⑤-6
⑥	Vertical grille	1. Remove the drain pan. 2. Remove the set screws (2 positions) of fixing vertical grille. 3. Remove the vertical grille.	Vertical grille  Screws (Fixing drain pan and vertical grille) ⑥-2
⑦	Louver motor, Lover drive member	1. Remove the side cover (right side only). 2. Remove the set screws (2 positions) and louver motor. 3. Remove the set screws (2 positions) and louver drive member.	Screws (Fixing louver drive member and main unit)  ⑦-3 Screws (Fixing louver motor and louver drive member)

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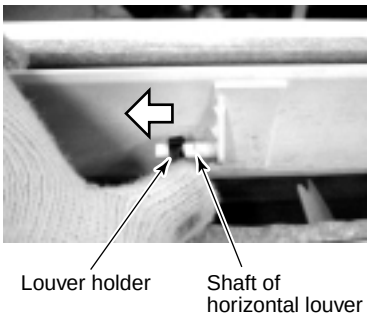
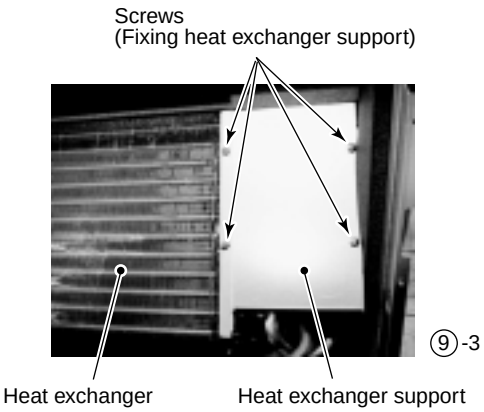
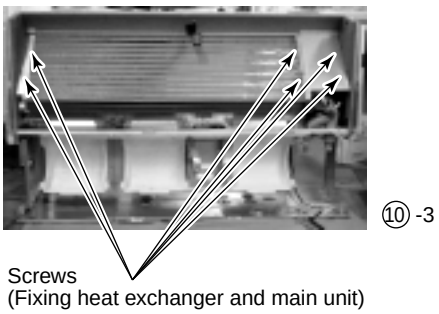
No.	Part name	Procedure	Remarks
⑧	Horizontal louver	1. Push the louver holder toward arrow direction of right figure, and pull out the center shaft (SM561, SM801 : 1 position, SM1101, SM1401 : 2 positions) from louver holder. 2. Pull off the left and right chaft of horizontal louver.	
⑨	TC, TCJ sensor	1. Remove the drain pan. 2. Remove the set screws (4 positions) and heat exchanger support. 3. Pull out the sensor is inserted into pipe of the heat exchanger.	
⑩	Heat exchanger	1. Take down the main unit and then treat the heat exchanger on the floor. 2. Remove the drain pan. 3. Remove the set screws (6 positions) of fixing heat exchanger and main unit.	

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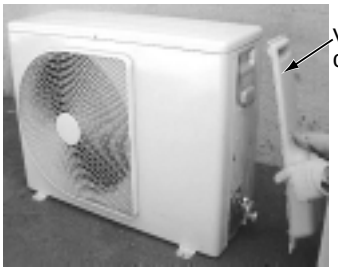
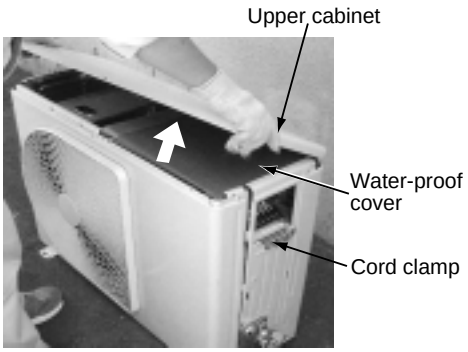
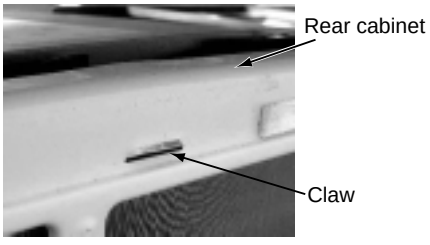
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

14-2. Outdoor Unit

RAV-SM560AT-E (A02-014)

No.	Part name	Procedure	Remarks
①	Common procedure	**CAUTION** Never forget to put on the gloves at working time, otherwise an injury will be caused by the parts, etc. **1. Detachment** 1) Stop operation of the air conditioner, and turn off the main switch of the breaker for air conditioner. 2) Remove the valve cover. (ST1T Ø4 x 10L, 1 pc.) • After removing screw, remove the valve cover pulling it downward. 3) Remove wiring cover (ST1T Ø4 x 10L, 2 pcs.), and then remove connecting cable. 4) Remove the upper cabinet. (ST1T Ø4 x 10L, 2 pcs.) • After taking off screws, remove the upper cabinet pulling it upward. **2. Attachment** 1) Attach the waterproof cover. **CAUTION** Be sure to attach a waterproof cover. If it is not attached, there is a possibility that water enters inside of the outdoor unit. 2) Attach the upper cabinet. (ST1T Ø4 x 10L, 2 pcs.) • Hook the rear side of the upper cabinet to claw of the rear cabinet, and then put it on the front cabinet. 3) Perform cabling of connecting cables, and fix with cord clamp. (ST1T Ø4 x 10L 3 pcs.) 4) Attach the wiring cover. (ST1T Ø4 x 10L, 2 pcs.) 5) Attach the valve cover. (ST1T Ø4 x 10L, 1 pc.) • Insert the upper part of the upper cabinet, set hooking claw of the valve cover to the slit (at three positions) of the main body, and then attach it pushing upward.	  

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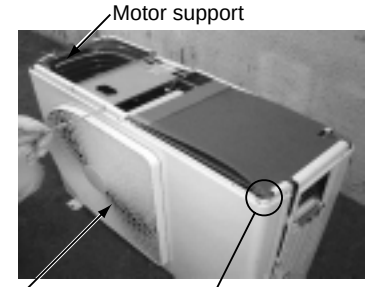
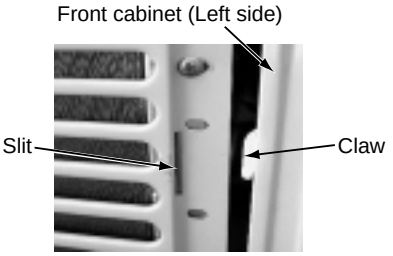
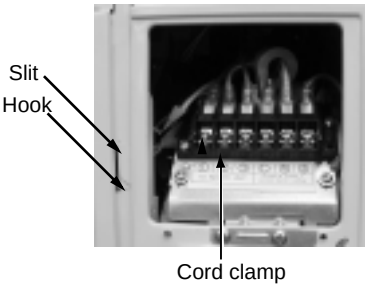
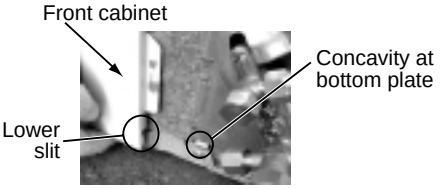
No.	Part name	Procedure	Remarks
②	Front cabinet	**1. Detachment** 1) Perform work of item 1 of ①. 2) Remove screws (ST1T Ø4 x 10L, 2 pcs.) of the front cabinet and the inverter cover. 3) Take off screws of the front cabinet and the bottom plate. (ST1T Ø4 x 10L 3 pcs.) 4) Take off screws of the front cabinet and the motor support. (ST1T Ø4 x 10L, 2 pcs.) • The left side of the front side if made to insert to the rear cabinet, so remove it pulling upward. **3. Attachment** 1) Insert hook at the left side of the front side into the rear cabinet. 2) Hook the lower part at the right side of the front to concavity of the bottom plate. Insert the hook of the rear cabinet into the slit of the front cabinet. 3) Attach the removed screws to the original positions.	   

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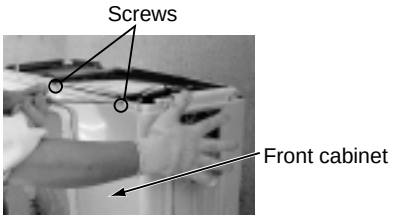
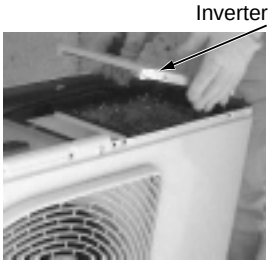
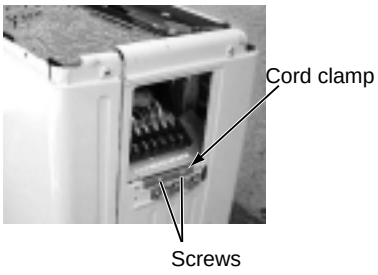
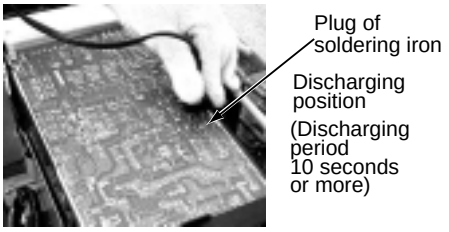
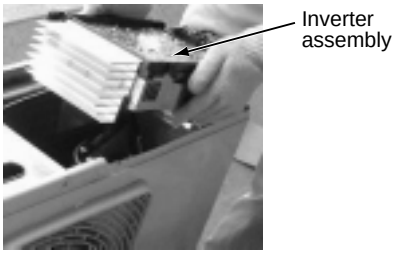
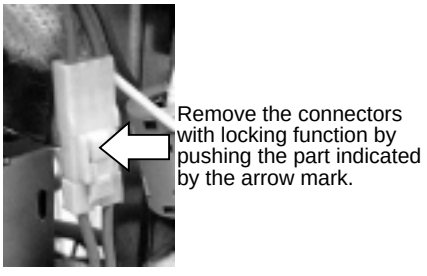
No.	Part name	Procedure	Remarks
③	Inverter assembly	**1. Detachment** 1) Perform work of item 1 of ①. 2) Take off screws of the upper part of the front cabinet. • If removing the inverter cover under this condition, P.C. board can be checked. • If there is no space in the upper part of the upper cabinet, perform work of ②. **CAUTION** Be careful to check the inverter because high-voltage circuit is incorporated in it. 3) Perform discharging by connecting ⊕, ⊖ polarities by discharging resistance (approx. 100Ω, 40W) or plug of soldering iron to ⊕, ⊖ terminals of the C14 (printed as "CAUTION HIGH VOLTAGE") electrolytic capacitor (500μF) of P.C. board. **WARNING** The electrolytic capacitor may not normally discharge according to error contents and the voltage may remain. Therefore, be sure to discharge the capacitor. **WARNING** For discharging, never use a screwdriver and others for short-circuiting between ⊕ and ⊖ electrodes. As the electrolytic capacitor is one with a large capacity, it is very dangerous because a large electric spark will occur. 4) Take off screws (ST1T Ø4 x 10L, 2 pcs.) fixing the main body and the inverter box. 5) Remove various lead wires from the holder at upper part of the inverter box and wiring holder at right side of the terminal block. 6) Remove the lead wire from the bundled part at left side of the terminal block. 7) Pull the inverter box upward. 8) Disconnect connectors of various lead wires. **REQUIREMENT** As each connector has a lock mechanism, avoid to remove the connector by holding the lead wire, but by holding the connector.	     

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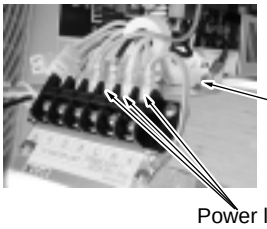
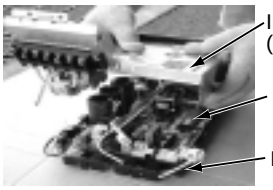
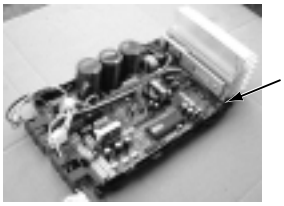
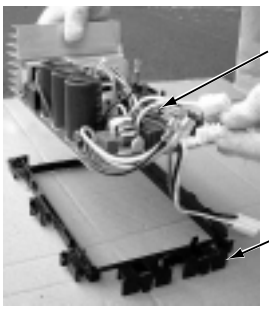
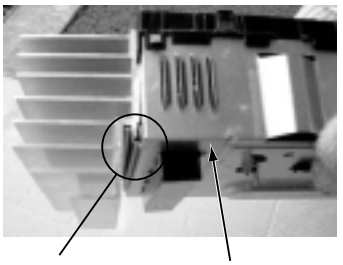
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
④	Control P.C. board assembly	1) Disconnect lead wires and connectors connected from the control P.C. board assembly to other parts. 1. Lead wires • Connection with the power terminal block: 3 wires (Black, White, Orange) • Earth wire: 1 wire (Black) 2. Connectors • Connection with compressor: Remove 3P connector. • Connection with reactor: Remove the relay connectors from P07, 08 (2P, White) and P12, 13 (2P, Yellow) CN300 : Outdoor fan (3P, White) CN301 : Position detection (5P, White) CN701 : 4-way valve (3P, Yellow) CN600 : TE sensor (2P, White) CN601 : TD sensor (3P, White) CN603 : TS sensor (3P, White) CN602 : TO sensor (3P, White) CN500 : Case thermo. (2P, White) CN703 : PMV (6P, White) 2) Remove the inverter box (Metal plate). 3) Remove the control board assembly from P.C. board base. (Remove the heat sink and the control board assembly as they are screwed.) **NOTES:** 1. CN300, CN301 and CN701, etc. at the control board assembly side are connectors with locking function. Therefore, remove the connector while pushing the part indicated by an arrow mark. 2. Remove 4 hooking claws of P.C. board base, and remove upward the heat sink with hands. 4) Take off 3 screws fixing the heat sink and main control board assembly side, and replace the board with a new one. **NOTE:** When mounting a new board, check that the board is correctly set in the groove of the base holder of P.C. board base. Attach the P.C. board so that the heat sink comes securely contact with the metal sheet.	    

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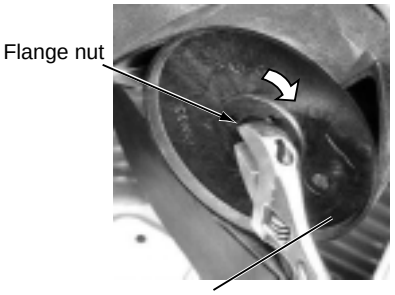
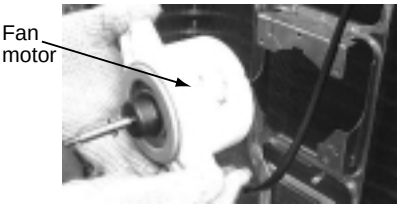
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
⑤	Rear cabinet	1) Perform works of items 1 of ① and ②, ③. 2) Take off fixed screws for the bottom plate. (ST1T Ø4 x 10L, 3 pcs.) 3) Take off fixed screws for the heat exchanger. (ST1T Ø4 x 10L, 2 pcs.) 4) Take off fixed screw for the valve mounting plate. (ST1T Ø4 x 10L, 1 pc.)	
⑥	Fan motor	1) Perform works of items 1 of ① and ②. 2) Take off the flange nut fixing the fan motor and the propeller. • Turning it clockwise, the flange nut can be loosened. (To tighten the flange nut, turn counterclockwise.) 3) Remove the propeller fan. 4) Disconnect the connector for fan motor from the inverter. 5) Take off the fixing screws (3 pcs.) holding by hands so that the fan motor does not fall. **NOTE:** Tighten the flange nut with torque 4.9Nm (50kgf/cm).	 

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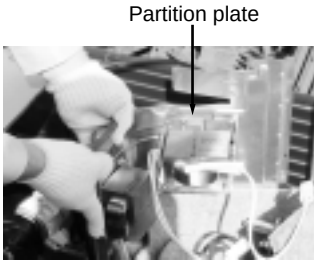
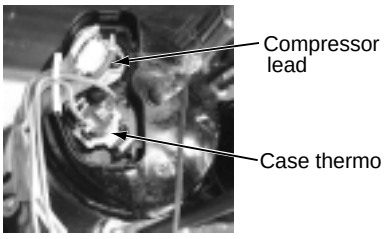
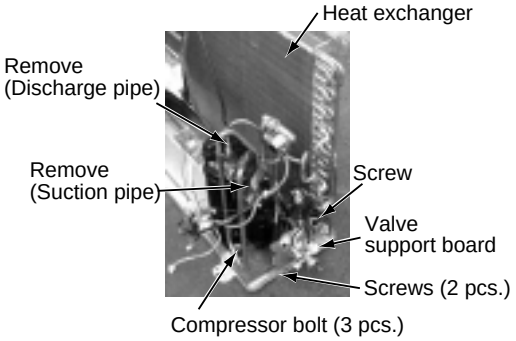
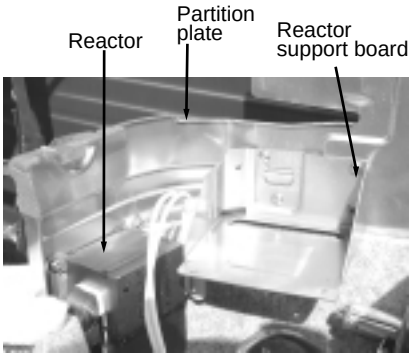
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
⑦	Compressor	1) Perform works of items 1 of ① and ②, ③, ④, ⑤. 2) Discharge refrigerant gas. 3) Remove the partition plate. (ST1T Ø4 x 10L, 2 pcs.) 4) Remove the noise-insulator. 5) Remove the terminal covers of the compressor, and disconnect lead wires of the compressor and the compressor thermo assembly from the terminal. 6) Remove pipes connected to the compressor with a burner. **CAUTION** Pay attention to that flame does not involve 4-way valve or PMV. (If doing so, a malfunction may be caused.) 7) Take off the fixing screws of the bottom plate and heat exchanger. (ST1T Ø4 x 10L, 2 pcs.) 8) Take off the fixing screws of the valve clamping plate to the bottom plate. 9) Pull upward he refrigerating cycle. 10) Take off nut fixing the compressor to the bottom place. **CAUTION** When reconnecting the lead wires to the compressor terminals after replacement of the compressor, be sure to caulk the Faston terminal without loosening.	  
⑧	Reactor	1) Perform works of item 1 of ① and ③. 2) First take off two screws (ST1T Ø4 x 10L) of the reactor fixed to the reactor support. 3) Remove the reactor support from the partition plate. (ST1T Ø4 x 10L, 4 pcs.) 4) Take off two screws (ST1T Ø4 x 10L) directly attached to the partition plate.	

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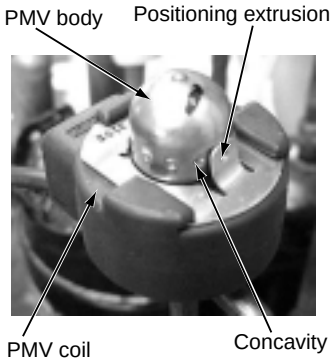
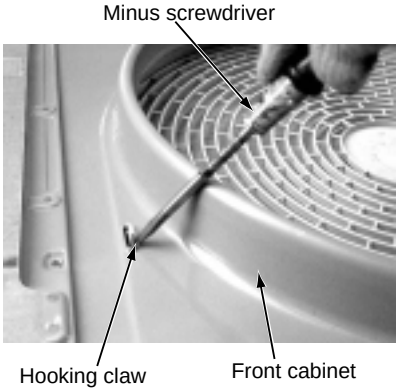
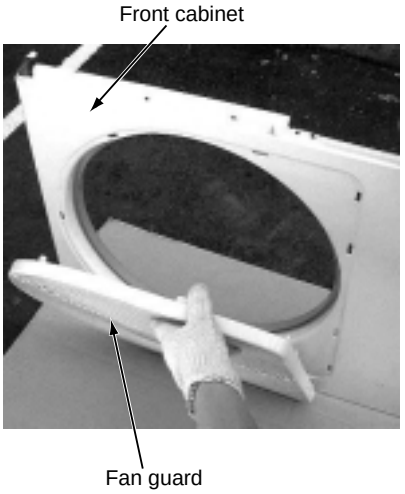
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
⑨	Pulse Modulating Valve (PMV) coil	**1. Detachment** 1) Perform works of items ① and ②. 2) Release the coil from the concavity by turning it, and remove coil from the PMV. **2. Attachment** 1) Put the coil deep into the bottom position. 2) Fix the coil firmly by turning it to the concavity.	
⑩	Fan guard	**1. Detachment** 1) Perform works of items 1 of ①, and ②. 2) Remove the front cabinet, and put it down so that fan guard side directs downward. **CAUTION** Perform works on a corrugated cardboard, cloth, etc. to prevent flaw on the product. 3) Remove the hooking claws by pushing with minus screwdriver along with the arrow mark in the right figure, and remove the fan guard. **2. Attachment** 1) Insert claws of the fan guard in the hole of the front cabinet. Push the hooking claws (10 positions) with hands and then fix the claws. **CAUTION** All the attaching works have completed. Check that all the hooking claws are fixed to the specified positions.	 

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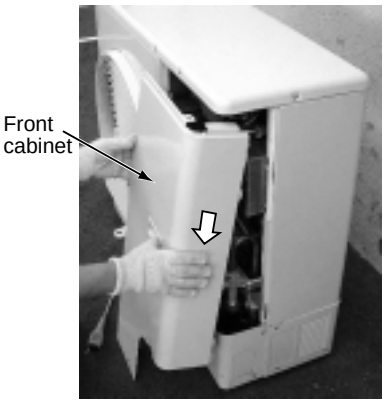
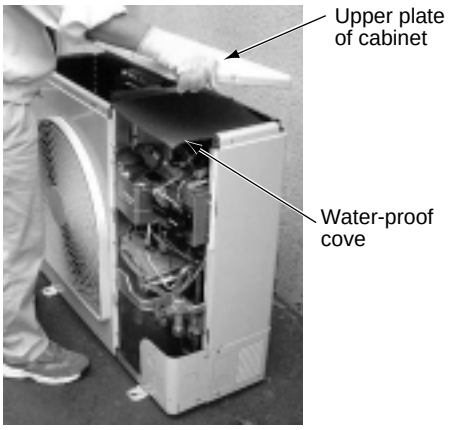
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM800AT-E (A02-014)
RAV-SP560AT-E, RAV-SP800AT-E (A03-014)

No.	Part name	Procedure	Remarks
①	Common procedure	**CAUTION** Never forget to put on the gloves at working time, otherwise an injury will be caused by the parts, etc. **1. Detachment** 1) Stop operation of the air conditioner, and also turn off switch of the breaker. 2) Remove the front panel. (ST1T Ø4 x 10L, 3 pcs.) • After taking off screws, remove the front panel by pulling it downward. 3) Disconnect the connecting cables and power cord from the terminals and cord clamp. 4) Remove the upper cabinet. (ST1T Ø4 x 10L, 6 pcs.) **2. Attachment** 1) Attach the waterproof cover. **CAUTION** Be sure to attach a waterproof cover. If it is not attached, there is a possibility that water enters inside of the outdoor unit. 2) Attach the upper cabinet. (ST1T Ø4 x 10L, 6 pcs.) 3) Connect the connecting cable and power cord at the terminal and fix them with cord clamp. **CAUTION** Using bundling band sold at a market, be sure to fix the power cables and indoor/ outdoor connecting cables along the inter-unit cable so that they do not come to contact with the compressor, valves and cables at gas side, and the discharge pipe. 4) Attach the front cabinet. (ST1T Ø4 x 10L, 3 pcs.)	 

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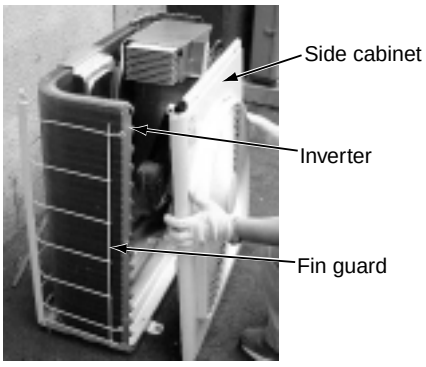
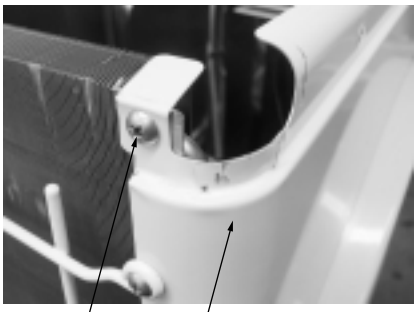
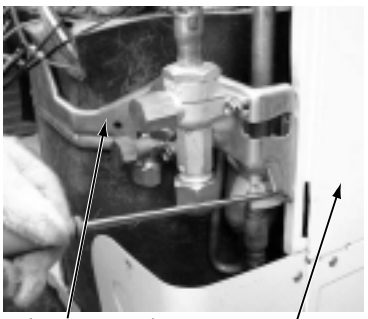
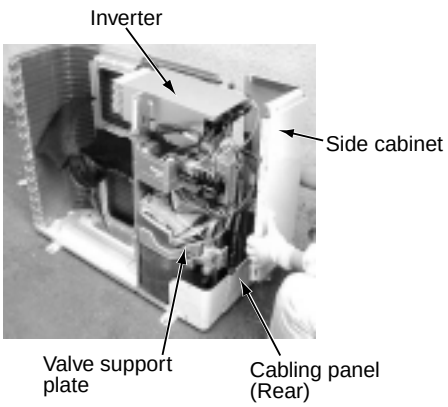
No.	Part name	Procedure	Remarks
②	Discharge port cabinet	**1. Detachment** 1) Perform work of item 1 of ①. 2) Take off screws (ST1T Ø4 x 10L, 3 pcs.) of discharge port cabinet for the partition plate. 3) Take off screws (ST1T Ø4 x 10L, 2 pcs.) of discharge port cabinet for the bottom plate. 4) Take off screw (ST1T Ø4 x 10L, 1 pc.) of discharge port cabinet for the heat exchanger. 5) Take off screws (ST1T Ø4 x 10L, 2 pcs.) of discharge port cabinet for the fin guard. **2. Attachment** 1) Put the upper left side of the discharge port cabinet on the end plate of the heat exchanger, and then fix it with screw. (ST1T Ø4 x 10L, 1 pc.) 2) Attach the removed screws to the original positions.	 
③	Side cabinet	1) Perform work of item 1 of ①. 2) Remove screw fixing the inverter and the side cabinet. (ST1T Ø4 x 10, 1 pc.) 3) Remove screws of the side cabinet and the valve support plate. (ST1T Ø4 x 10, 2 pcs.) 4) Remove screw of the side cabinet and the cabling panel (Rear). (ST1T Ø4 x 10, 1 pc.) 5) Remove screw of the side cabinet and the bottom plate. (ST1T Ø4 x 10, 1 pc.) 6) Remove screw of the side cabinet and the fin guard (Heat exchanger). (ST1T Ø4 x 10, 2 pcs.)	 

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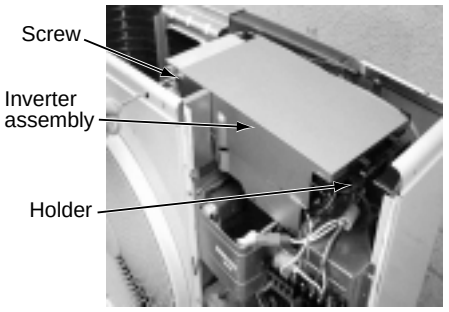
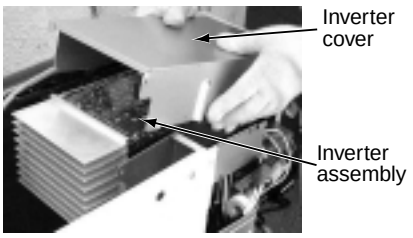
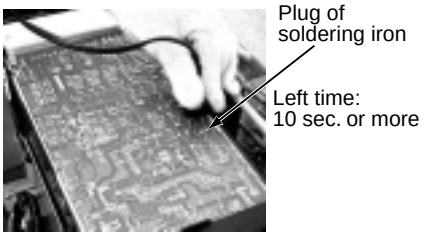
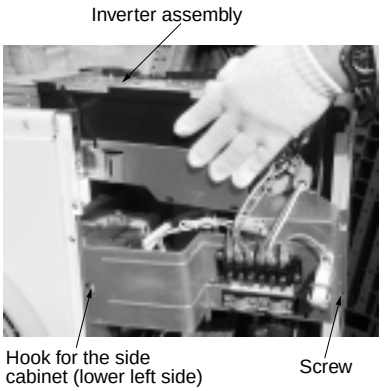
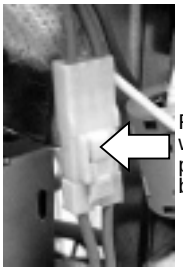
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
④	Inverter assembly	1) Perform works of items of 1) to 5) of ①. 2) Take off screw (ST1T Ø4 x 10L, 1 pc.) of the upper left part of the inverter cover. • If removing the inverter cover under this condition, P.C. board can be checked. • If there is no space in the upper part of the upper cabinet, perform works of items 6) to 7) of (1) and remove the partition fixing plate. (ST1T Ø4 x 10L, 1 pc.) **CAUTION** Be careful to check the inverter because high-voltage circuit is incorporated in it. 3) Perform discharging by connecting the discharging resistance (approx. 100Ω, 40W) or plug of soldering iron to ⊕, ⊖ terminals of the C10 too 13 (printed as "CAUTION HIGH VOLTAGE") electrolytic capacitor (760µF) of P.C. board. **WARNING** The electrolytic capacitor may not normally discharge according to error contents and the voltage may remain. Therefore, be sure to discharge the capacitor. **WARNING** For discharging, never use a screwdriver and others for short-circuiting between ⊕ and ⊖ electrodes. As the electrolytic capacitor is one with a large capacity, it is very dangerous because a large electric spark will occur. 4) Remove various lead wires from the holder at upper part of the inverter box. 5) Remove the hook for the partition plate (lower left side). 6) Remove the hook for the side cabinet (lower left side) and the screw, and lift up the inverter assembly upward. (ST1T Ø4 x 10L, 1 pc.) In this time, cut off the band bundling each lead wire. 7) Disconnect connectors of various lead wires. **REQUIREMENT** As each connector has a lock mechanism, avoid to remove the connector by holding the lead wire, but by holding the connector.	    

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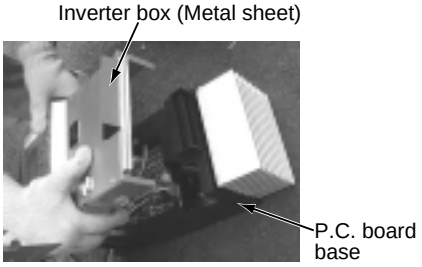
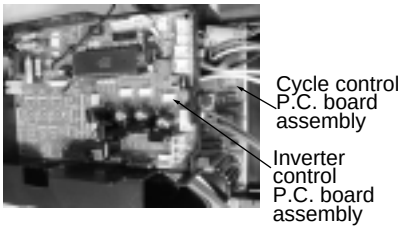
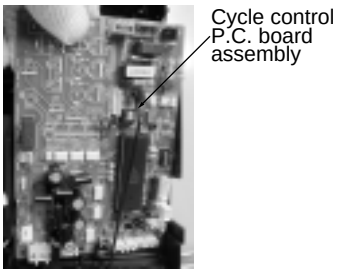
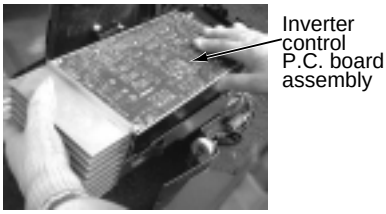
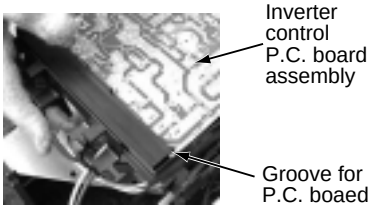
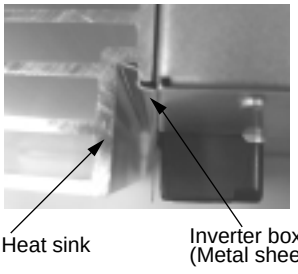
No.	Part name	Procedure	Remarks
⑤	Control P.C. board assembly	1) Remove the inverter box from P.C. board base. 2) Disconnect lead wires and connectors connected from the control P.C. board assembly to other parts. 1. Lead wires: With the power terminal block: 2 pcs. (Single phase) (Red, White) With the compressor: 3 pcs. (Red, White, Black) 2. Connectors CN301 : Outdoor fan (3P, White) ***Note 1)** CN300 : Position detection (5P, White) CN700 : 4-way valve (3P, Yellow) ***Note 1)** CN702 : PMV coil (6P, White) CN600 : TD sensor (3P, White) CN605 : TS sensor (3P, White) ***Note 1)** CN604 : TE sensor (2P, White) ***Note 1)** CN601 : TO sensor (2P, White) CN02 : Indoor/Outdoor connecting terminal block (2P, Black) CN500 : Case thermo (2P, White) ***Note 1)** CN14, CN15 : Reactor (3P, Relay connector, Blue) ***Note 1)** ***Note 1)** Remove the connector while releasing locking of the housing. 3) Remove the control P.C. board assembly from P.C. board base. (Remove the heat sink and the inverter control P.C. board assembly as they are screwed.) **Note 2)** Remove the heat sink upward by taking off two claws of P.C. base and holding the heat sink. 4) Take off three screws fixing the heat sink to the control P.C. board assembly. 5) Mount a new control P.C. board assembly. **Note 3)** When mounting a new board, check that it is correctly set in the groove of the base holder of P.C. board base.	     

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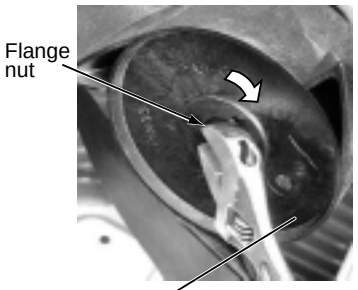
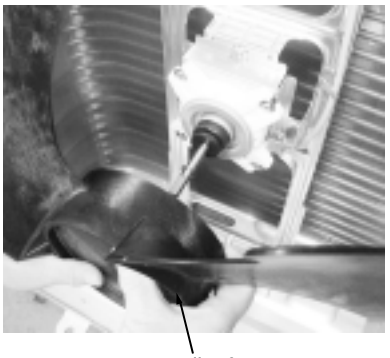
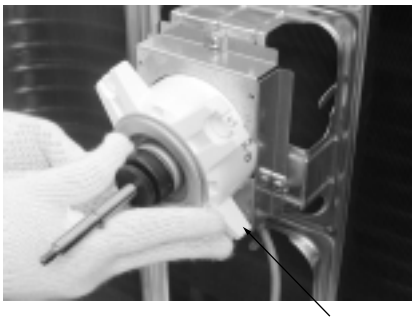
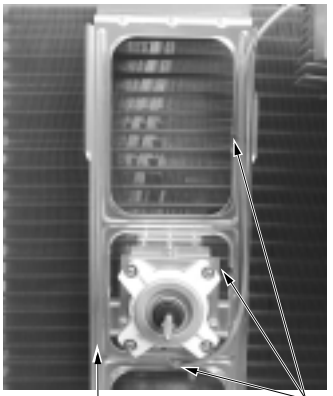
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
⑥	Fan motor	1) Perform works of items 1) to 5), 7) of ① 2) Remove the flange nut fixing the fan motor and the propeller fan. • Loosen the flange nut by turning clockwise. (To tighten the flange nut, turn it counterclockwise.) 3) Remove the propeller fan. 4) Remove the lead wire from the hook fixing the fan motor lead wires on the motor base. (Three positions) 5) Disconnect the connector for fan motor from the inverter. 6) Take off the fixing screws (4 pcs.) while holding by hands so that the fan motor does not fall. **NOTE :** Tighten the flange nut with torque 9.8Nm (100kgf/cm).	   

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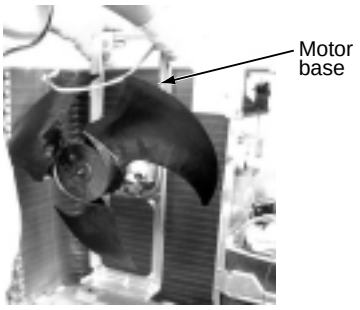
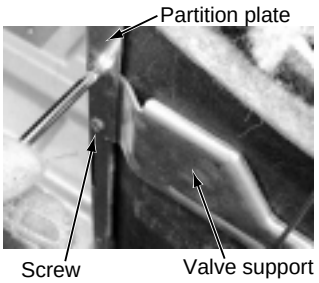
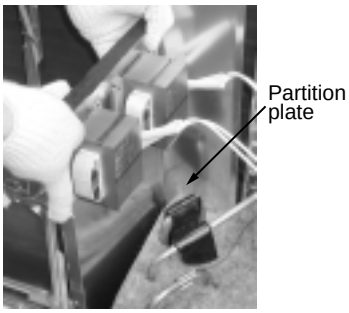
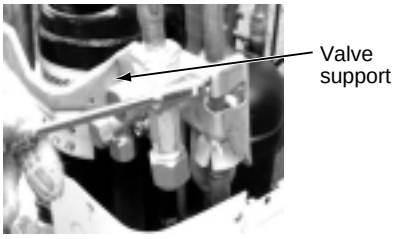
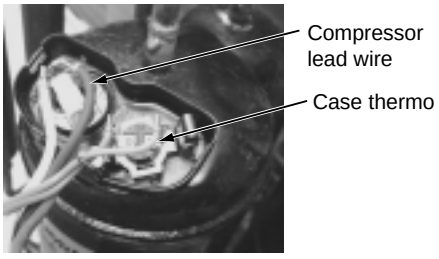
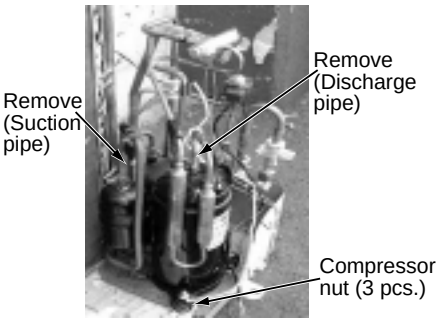
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
⑦	Compressor	1) Perform works of items ①, ②, ③, ④, and ⑤. 2) Evacuate refrigerant gas. 3) Disconnect the connector for fan motor from the inverter. 4) Take off screws fixing the motor base to the bottom plate. (ST1T Ø4 x 10L, 2 pcs.) 5) Remove the motor base together with the fan motor and the propeller fan. 6) Take off screws fixing the partition plate to the valve support plate. (ST1T Ø4 x 10L, 2 pcs.) 7) Remove the valve support plate. (M6 x 4 pcs.) 8) Take off screws of the partition plate and the bottom plate. (ST1T Ø4 x 10L, 2 pcs.) 9) Take off screws of the partition plate and the heat exchanger. (ST1T Ø4 x 10L, 2 pcs.) 10) Remove the noise-insulator. 11) Remove the terminal covers of the compressor, and disconnect lead wires of the compressor and the compressor thermo assembly from the terminal. 12) Remove pipes connected to the compressor with a burner. **CAUTION** Pay attention to that flame does not involve 4-way valve or PMV. (If doing so, a malfunction may be caused.) 13) Pull the refrigerating cycle upward. 14) Take off nut fixing the compressor on the bottom plate. (3 pcs.) 15) Pull the compressor toward you. **CAUTION** When reconnecting the lead wires to the compressor terminals after replacement of the compressor, be sure to caulk the Faston terminal without loosening.	     

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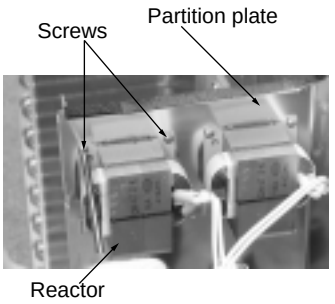
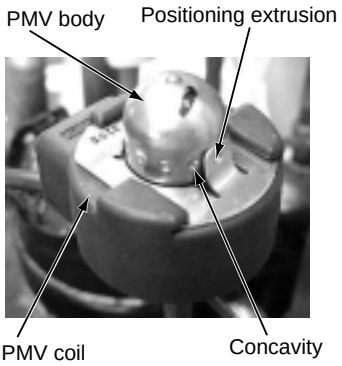
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
⑧	Reactor	1) Perform works of items 1 of ① and ④. 2) Take off screws fixing the reactor. (Ø4 x 10L , 2 pcs. per one reactor. An outdoor unit has two reactors on the partition plate.)	
⑨	Pulse Modulating Valve (PMV) coil	**1. Detachment** 1) Perform works of items 1 of ① and ③. 2) Remove the coil from PMV body while pulling it upward. **2. Attachment** 1) Match the positioning extrusion of the coil surely to the concavity of PMV body to fix it.	

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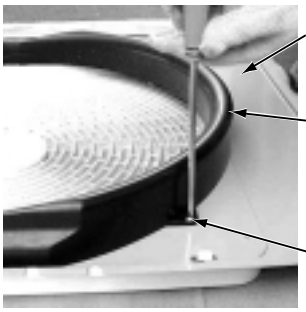
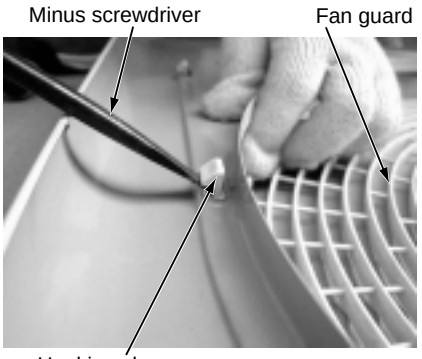
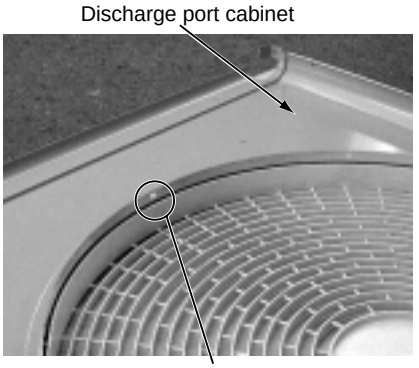
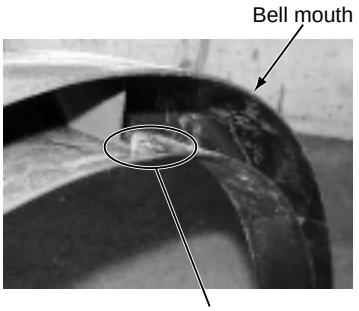
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
⑩	Fan guard	**1. Detachment** 1) Perform works of items 1 of ① and ④. 2) Remove the air flow cabinet, and put it down so that the fan guard side directs downward. **Perform work on a corrugated cardboard, cloth, etc. to prevent flaw to the product.** 3) Take off screws fixing the bell mouth. (ST1Tf4 x 10L, 2 pcs.) 4) Remove the bell mouth. 5) Remove the hooking claws by pushing with minus screwdriver along with the arrow mark as shown in right figure. **2. Attachment** 1) Insert claw of the fan guard in hole of the discharge panel. Push the hooking claws (5 positions) with hands and fix the claws. **After all the attachment works are completed, check that all the hooking claws are fixed to the specified positions.** 2) Mount the bell mouth by hooking three claws at upper side of the bell mouth in the slits on the discharge cabinet. 3) After attachment, fix the bell mouth with screws. (ST1Tf4 x 10L, 2 pcs.)	   

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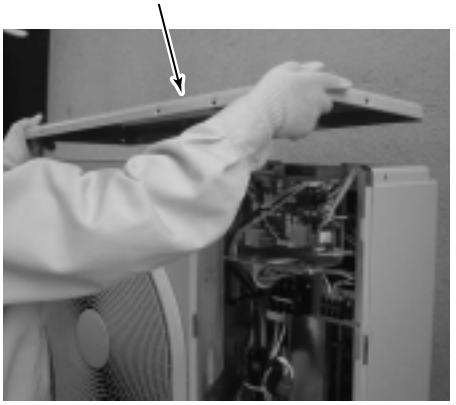
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM1100AT-E, RAV-SM1400AT-E (A03-003)
RAV-SP1100AT-E, RAV-SP1400AT-E (A03-014)

No.	Part name	Procedure	Remarks
①	Common procedure	**REQUIREMENT** Before works, put on gloves, otherwise an injury may be caused by parts, etc. **1. Detachment** 1) Stop operation of the air conditioner, and turn off switch of the breaker. 2) Remove the front panel. (ST1T Ø4 × 10, 3 pcs.) • After removing the screws, remove the front panel while drawing it downward. 3) Remove the power cable and the indoor/ outdoor connecting cable from cord clamp and terminal. 4) Remove the roof plate. (ST1T Ø4 × 10, 6 pcs.) **2. Attachment** 1) Mount the roof plate. (ST1T Ø4 × 10, 6 pcs.) 2) Connect the power cable and the indoor/ outdoor connecting cable to terminal, and then fix them with cord clamp. **REQUIREMENT** Be sure to fix the power cable and the indoor/outdoor connecting cable with bundling band on the market along the inter-unit cable so that they do not come to contact with the compressor, the valve and the cable at gas side, and the discharge pipe. 3) Attach the front panel. (ST1T Ø4 × 10, 3 pcs.)	Front panel Roof plate 

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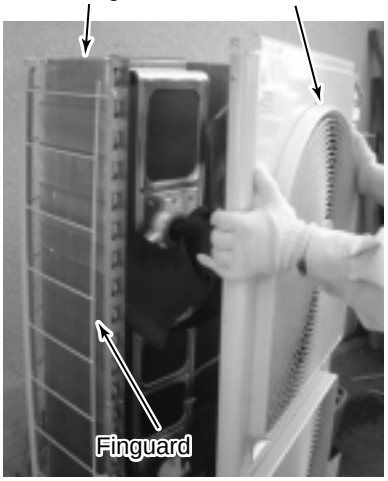
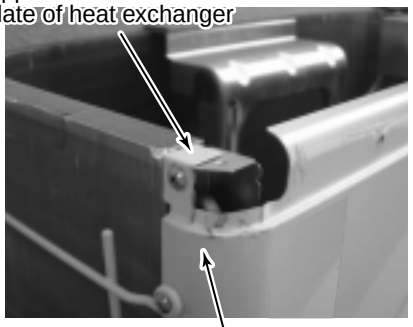
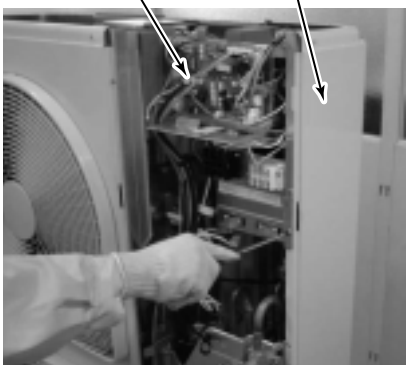
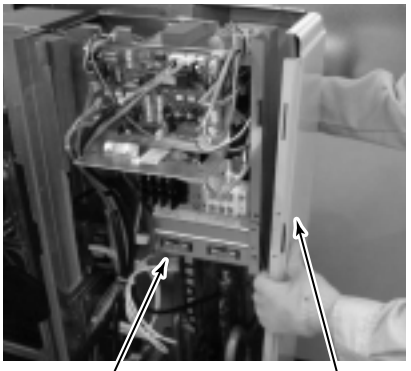
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
②	Air-outlet cabinet	**1. Detachment** 1) Perform the work in 1 of ①. 2) Take off screws for the air-outlet cabinet and the partition plate. (ST1T Ø4 × 10, 3 pcs.) 3) Take off screws for the air-outlet cabinet and the base plate. (ST1T Ø4 × 10, 2 pcs.) 4) Take off screw for the air-outlet cabinet and the heat exchanger. (ST1T Ø4 × 10, 1 pc.) 5) Take off screws for the air-outlet cabinet and the fin guard. (ST1T Ø4 × 10, 2 pcs.) **2. Attachment** 1) Put the upper left side of the air-outlet cabinet on the end plate of heat exchanger, and fix it with screw. (ST1T Ø4 × 10, 1 pc.) 2) Attach the taken-off screws to the original positions.	Heat exchanger Air-outlet cabinet  Finguard Upper side of the end plate of heat exchanger  Air-outlet cabinet
③	Side cabinet	1) Perform the work in 1 of ①. 2) Take off screws fixing the inverter and the side cabinet. (ST1T Ø4 × 10, 2 pcs.) 3) Take off screws for the side cabinet and the valve fixed plate. (ST1T Ø4 × 10, 2 pcs.) 4) Take off screw for the side cabinet and the piping panel (Rear). (ST1T Ø4 × 10, 1 pc.) 5) Take off screw for the side cabinet and the base plate. (ST1T Ø4 × 10, 1 pc.) 6) Take off screws for the side cabinet and the fin guard. (ST1T Ø4 × 10, 4 pcs.)	Inverter Side cabinet   Valve fixed plate Side cabinet

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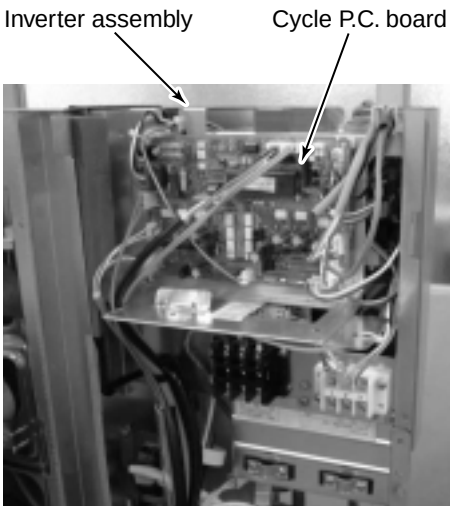
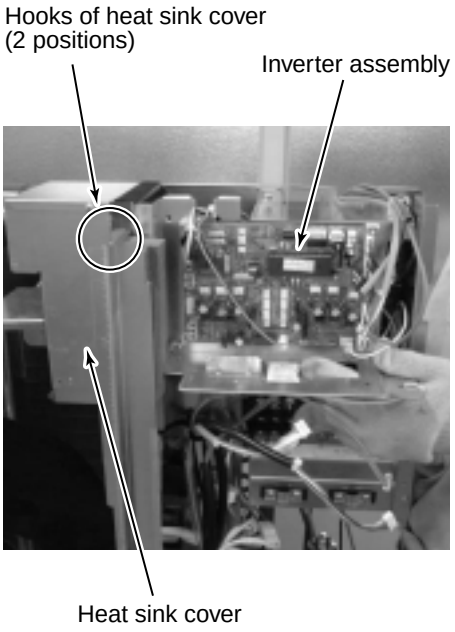
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
④	Inverter assembly	1) Perform the works in 1 of ① and ③. 2) Remove connectors which are connected from the cycle P.C. board to other parts. CN600: TD sensor (3P: White) CN601: TO sensor (2P: White) CN604: TE sensor (2P: White) *(Note 1) CN605: TS sensor (3P: White) *(Note 1) CN301: Upper outdoor fan (3P: White) *(Note 1) CN300: Detection of upper position (5P: White) CN303: Lower outdoor fan (3P: White) *(Note 1) CN302: Detection of lower position (5P: White) CN500: Case thermo. (2P: White) *(Note 1) CN700: 4-way valve (3P: Yellow) *(Note 1) CN702: PMV (Pulse Motor Valve) coil (6P: White) Relay connector: Reactor 2 pcs. (3P: White) *(Note 1) Compressor lead: Remove terminal cover of the compressor, and remove the lead wire from terminal of the compressor. ***(Note 1)** Remove the connectors by releasing lock of the housing. 3) Remove various lead wires from the holder at upper part of the inverter. 4) Cut off tie lap which fixes various lead wires to the inverter assembly. 5) Lift up the hook (upper left) with the partition plate upward just removing. * Caution to mount the inverter assembly Mount the inverter assembly to the partition plate so that hooks of the heat sink cover do not come near the partition plate but also near the fan side.	 

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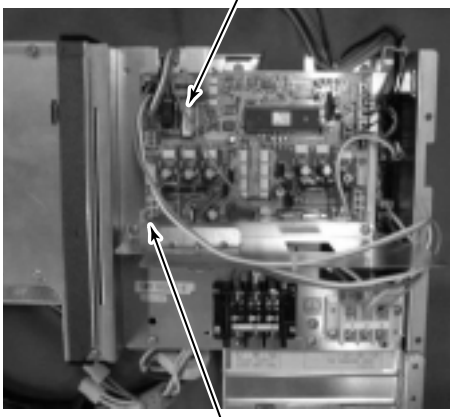
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
⑤	Cycle P.C. board	1) Perform the works in 1 of ① and ③. 2) Remove connectors and lead wires which are connected from the cycle P.C. board to other parts. 1. Connector CN800: Connection with IPDU P.C. board (5P: Red) CN01: Connection with IPDU P.C. board (5P: Red) *(Note 1) CN02: Indoor/Outdoor connection terminal block (3P: Black) *(Note 1) CN03: Connection with IPDU P.C. board (3P: White) *(Note 1) CN04: Connection with IPDU P.C. board (2P: White) *(Note 1) ***(Note 1)** Remove the connectors by releasing lock of the housing. 3) Remove the supporting hooks at 4 corners to remove the cycle P.C. board. 4) Mount a new cycle P.C. board. 5) Lift up the hook (upper left) with the partition plate upward just removing.	Cycle control P.C. board assembly  P.C. board fixing hooks (4 positions)

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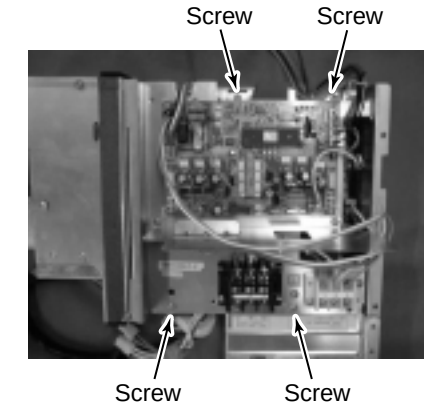
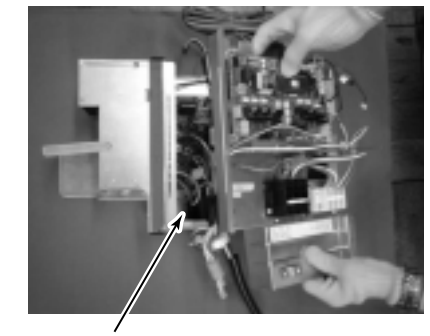
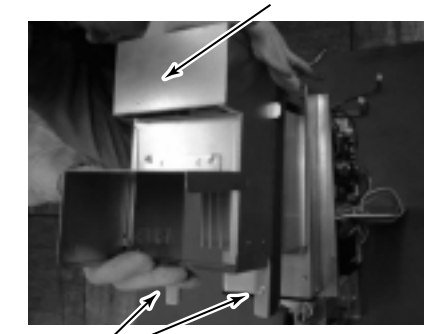
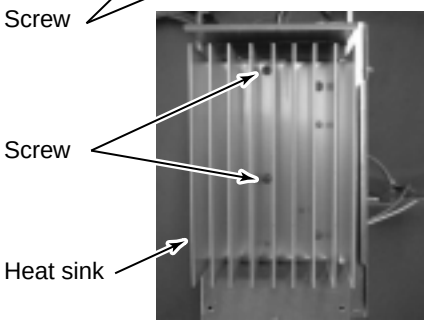
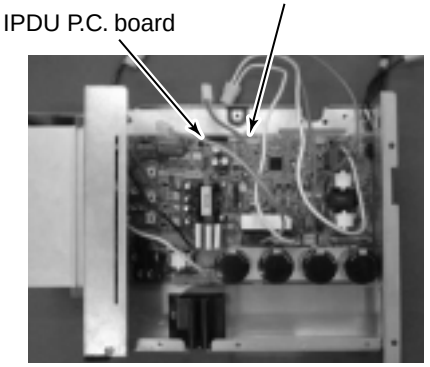
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
⑥	IPDU P.C. board	1) Perform the works in ④ and ⑤. 2) Take off screws of the inverter assembly to separate the inverter assembly. (M4 × 8, 4 pcs) 3) Remove the connectors and the lead wires which are connected from IPDU P.C. board to the other parts. 1. Connector CN04: Connection with cycle P.C. board (3P: White) CN05: Connection with cycle P.C. board (2P: White) *(Note 1) CN06: Connection with cycle P.C. board (5P: White) CN13: Connection with cycle P.C. board (5P: Red) *(Note 1) CN600: Heat sink sensor (2P: Black) 2. Lead wire CN01: Connection with power terminal block (Red) CN02: Connection with power terminal block (White) CN03: Connection with inverter box (Black) CN09: Connection with compressor (Red) CN10: Connection with compressor (White) CN11: Connection with compressor (Black) Rectifier diode ⊕ : Red lead wire *Note 2 ⊖ : White lead wire *Note 2 ~ (Top) : Orange lead wire ~ (Bottom) : Brown lead wire ***(Note 1)** Remove the connectors by releasing lock of the housing. 4) Remove the heat sink cover. (M4 × 8, 2pcs) 5) Take off two screws which fix the heat sink and IGBT and also take off support hooks of the P.C. board (5 positions) to remove IPDU P.C. board. 6) Mount a new IPDU P.C. board. ***(Note 2)** The rectifier diode has polarity, so be careful to ⊕ and ⊖. If ⊕ and ⊖ are mistaken, a trouble is caused.	    P.C. board fixing hooks (5 positions) IPDU P.C. board 

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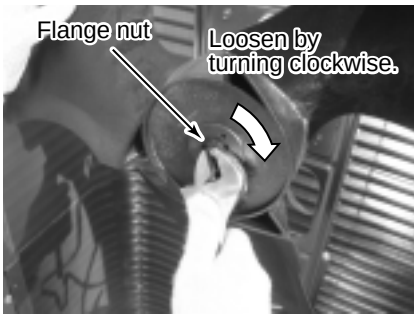
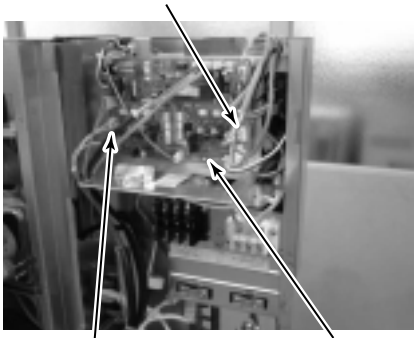
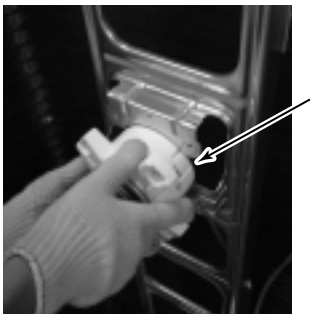
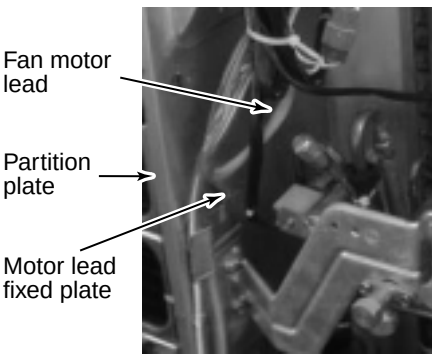
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
⑦	Fan motor	1) Perform the works in 1 of ① and 1 of ②. 2) Take off flange nut fixing the fan motor with the propeller fan. • Loosen the flange nut by turning clockwise. (When tightening, turn it counterclockwise.) 3) Remove the propeller fan. 4) Remove connector for the fan motor from the inverter. 5) Take off fixing screws (4 pcs) with supporting the fan motor so that it does not fall down. 6) When replacing the fan motor at lower side, remove the motor lead fixed plate which is fixed to the partition plate with screw (ST1Tf4´10, 1 pc), pull the fan motor lead out of the partition plate, and then remove the fan motor. *** Cautions in assembling fan motor** **<In case of RAV-SM1100AT-E>** • Be sure to mount the propeller fan and the fan motor at upper and lower sides because they are different. • Tighten the flange nut with the following torque. Upper side: 9.8N·m (100kgf·cm) Lower side: 4.9N·m (50kgf·cm) **<In case of RAV-SM1400AT-E>** • The same propeller fan and the fan motor are used at upper and lower sides. • Tighten the flange nut with the following torque. Upper side: 9.8N·m (100kgf·cm) Lower side: 9.8N·m (100kgf·cm) • Be sure to mount the motor lead fixed plate so that the fan motor lead is not caught in. • Be sure that the propeller fan does not come to contact with the fan motor lead.	 Propeller fan Fan motor connector at upper side  Fan motor connector at lower side  

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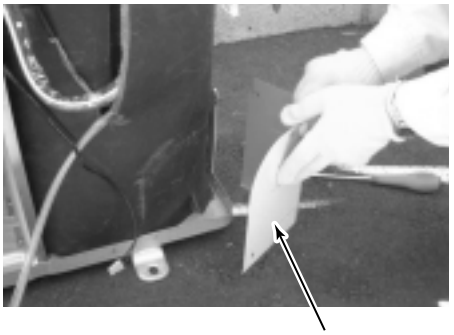
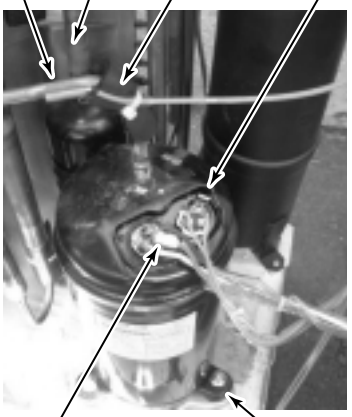
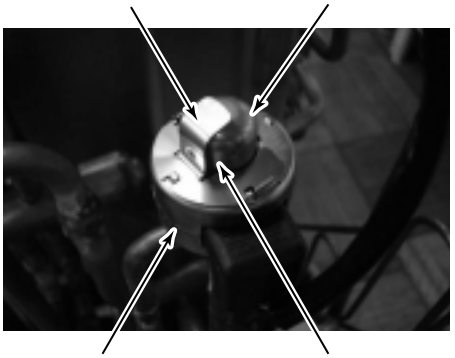
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
⑧	Compressor	1) Recover refrigerant gas. 2) Perform the works in 1 of ① and in ③. 3) Remove the piping panel (Front). Take off screws of the piping panel (Front) and the base plate. (ST1T Ø4 × 10, 2 pcs) Take off screws of the piping panel (Front) and the piping panel (Rear). (ST1T Ø4 × 10, 2 pcs) 4) Remove the piping panel (Rear). Take off screws of the piping panel (Rear) and the base plate. (ST1T Ø4 × 10, 2 pcs) 5) Remove the sound-insulation plate. 6) Remove terminal cover of the compressor, and then remove compressor lead and case thermo. of the compressor. (ST1T Ø4 × 10, 2 pcs) 7) Remove TD sensor fixed to the discharge pipe. 8) Using a burner, remove pipe connected to the compressor. **NOTE)** Pay attention that 4-way valve or PMV is not exposed to a flame. (Otherwise, a malfunction may be caused.) 9) Pull out discharge pipe and suction pipe of the refrigerating cycle upward. 10) Take off the compressor nuts (3 pcs) fixing the compressor to the base plate. 11) Draw out the compressor toward you.	 Piping panel (Front) Piping panel (Rear) Remove (Suction pipe) Remove (Discharge pipe) TD sensor Case thermo.  Compressor lead Compressor nuts (3 pcs)
⑨	PMV coil	**1. Detachment** 1) Perform the works in 1 of ① and in ③. 2) Hold outside of the coil by hands and turn it while lifting upward. The fixing hooks come off the fixing concavities and then the coil can be removed from PMV body. **2. Attachment** 1) Match the positioning extrusion of the coil surely to the concave part of PMV body, and then fix it.	Positioning extrusion PMV body  PMV coil Concave part

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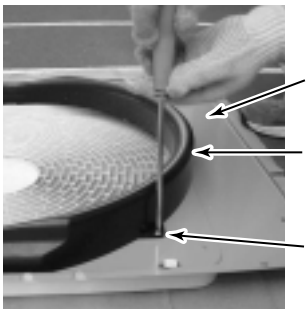
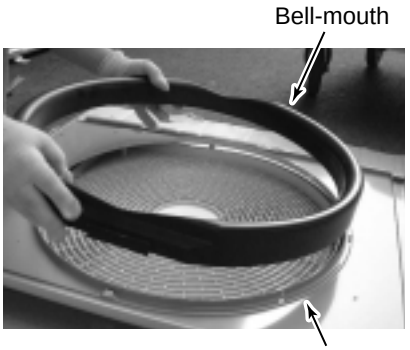
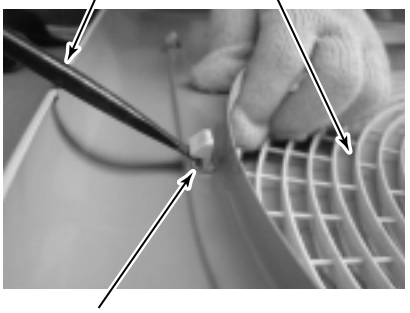
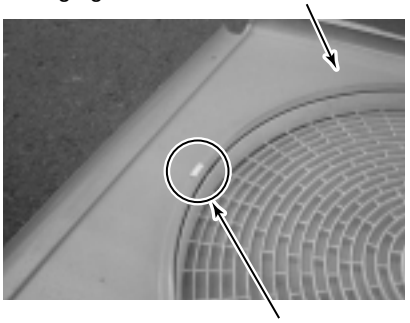
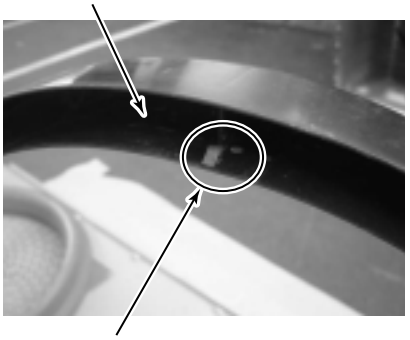
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

No.	Part name	Procedure	Remarks
⑩	Fan guard	**1. Detachment** 1) Perform the works in 1 of ① and in 1 of ②. **REQUIREMENT** To prevent damage on the products, treat component on a corrugated paper, cloth, etc. 2) Remove the air-outlet cabinet, and then put down it directing the fan guard side downward. 3) Take off screws fixing the bell-mouth. (ST1T Ø4 × 10, 2 pcs) 4) Remove the bell-mouth. 5) Take off screws fixing the fan guard. (ST1T Ø4 × 10, 2 pcs) 6) Remove hanging hook of the fan guard by pushing with a minus screwdriver. **2. Attachment** 1) Insert the extrusion at the upper side of the fan guard into the square hole of the air-outlet cabinet, and then insert the hanging hook. Fix the hanging hooks (5 positions) by pushing with hands. **REQUIREMENT** Check that all the hanging hooks are fixed to the specified positions. 2) After attachment, fix it with screws. (ST1T Ø4 × 10, 2 pcs) 3) Mount the bell-mouth by hanging hooks (3 positions) at upper side of the bell-mouth to the square holes of the air-outlet cabinet. 4) After attachment, fix it with screws. (ST1T Ø4 × 10, 2 pcs) *** Caution in assembling bell-mouth** • The size (color) of the bell-mouth at upper side differs from that at lower side. (Only for RAV-SM1100AT-E) **<In case of RAV-SM1100AT-E>** Upper side: Black Lower side: Gray **<In case of RAV-SM1400AT-E>** Upper side: Black Lower side: Black	    

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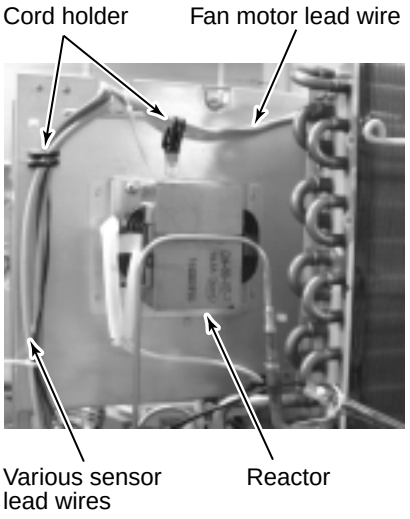
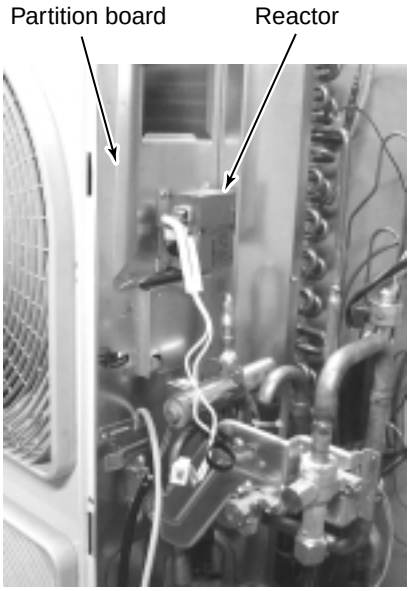
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SP1100AT-E, RAV-SP1400AT-E (A03-014)

No.	Part name	Procedure	Remarks
⑪	Reactor	1) Perform works of items ① to ④. **NOTE)** The same two reactors are installed to this outdoor unit though each installation place is different. One is attached to a partition board, and the other is attached to an electric parts box. 2) Remove the connector of the reactor lead wire connected to the inverter assembly. 3) Remove fixing screws of the reactor. **<Cautions for assembling>** The temperature of the reactor becomes high during operation of the outdoor unit. Using a cord holder, fix various sensor lead wires or fan motor lead wires in the surroundings of the reactor to be fixed to the electric parts box as shown below so that they do not come to contact with the reactor.  	

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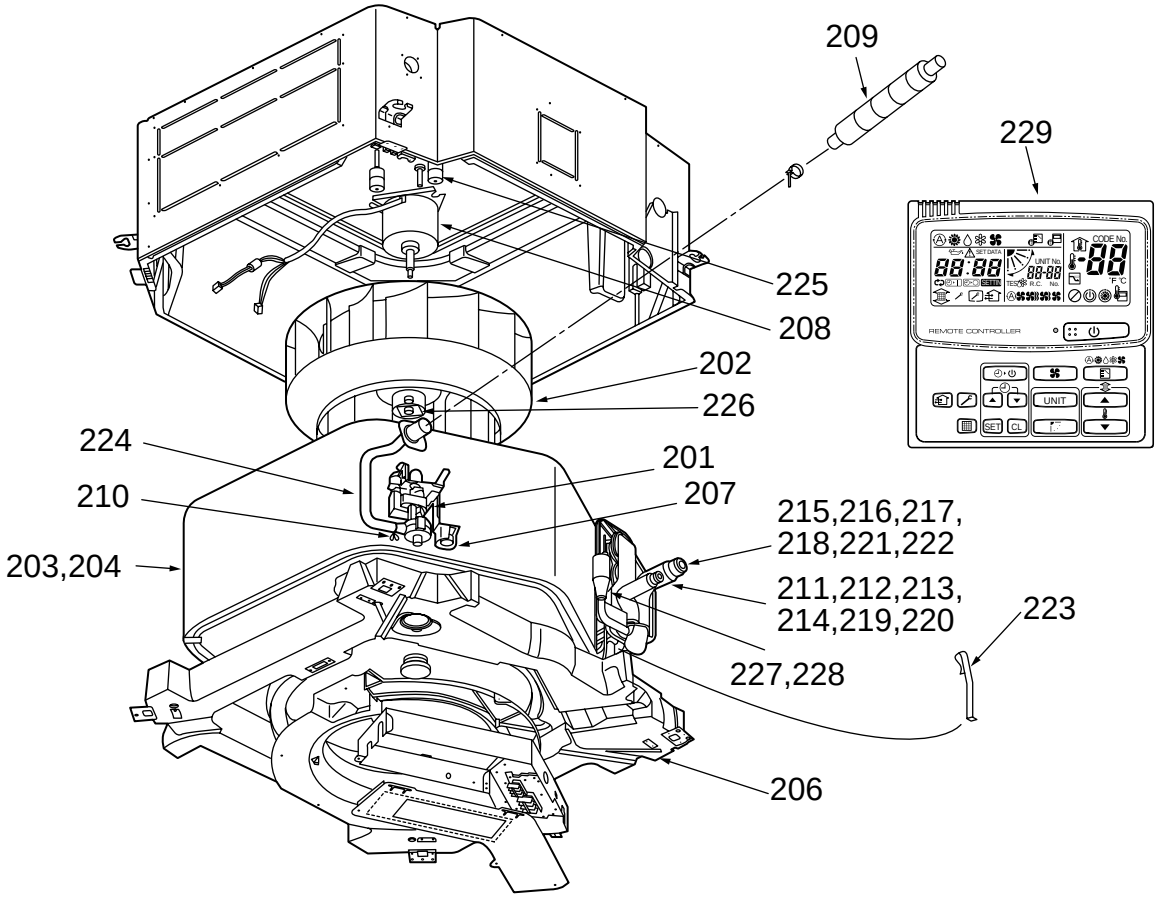
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

15. EXPLODED VIEWS AND PARTS LIST

15-1. Indoor Unit

15-1-1. 4-Way Air Discharge Cassette Type

RAV-SM560UT-E, RAV-SM800UT-E (A02-014)



Location No.	Part	Description
201	43121703	Pump, Drain, ADP-1409, 220-240V
202	43120215	Fan, Ass'y Turbo, TJ461
203	4314J122	Refrigeration Cycle Ass'y
204	4314J123	Refrigeration Cycle Ass'y
205	4318T313	Owner's Manual
206	43172160	Pan Ass'y, Drain, PS-F+ABS, Sheet
207	43151279	Switch, Float, FS-0218-106
208	43121692	Motor, Fan, SWF-230-60-1
209	43170232	Hose, Drain, 25A
210	43079249	Band, Hose
211	43047545	Nut, Flare, 1/4 IN, Ø6.35
212	43047546	Nut, Flare, 3/8 IN, Ø9.52
213	43194051	Socket, Ø6.35
214	43194026	Socket, Ø9.52
215	43194081	Nut, Flare, 1/2 IN, Ø12.7
215	43194081	Nut, Flare, 1/2 IN, Ø12.7

Location No.	Part	Description
216	43194078	Nut, Flare, 5/8 IN, Ø15.88
217	43194080	Socket, 1/2 IN, Ø12.7
218	43194079	Socket, 5/8 IN, Ø15.88
219	43049697	Bonnet, Ø6.35
220	43047609	Bonnet, Ø9.52
221	43147195	Bonnet, 1/2 IN, Ø12.7
222	43194029	Bonnet, Ø15.88
223	43019904	Holder, Sensor, SUS
224	43170231	Hose, Drain
225	43139137	Rubber, Cushion
226	43097204	Nut
227	43147656	Distributor Ass'y
228	43147657	Distributor Ass'y
229	4316V194	Remote Controller, SX-A3JE
230	4316V195	Remote Controller, SX-A11JE
231	4316V196	Remote Controller, WX-W2JE
232	4316V197	Remote Controller, WH-H1JE

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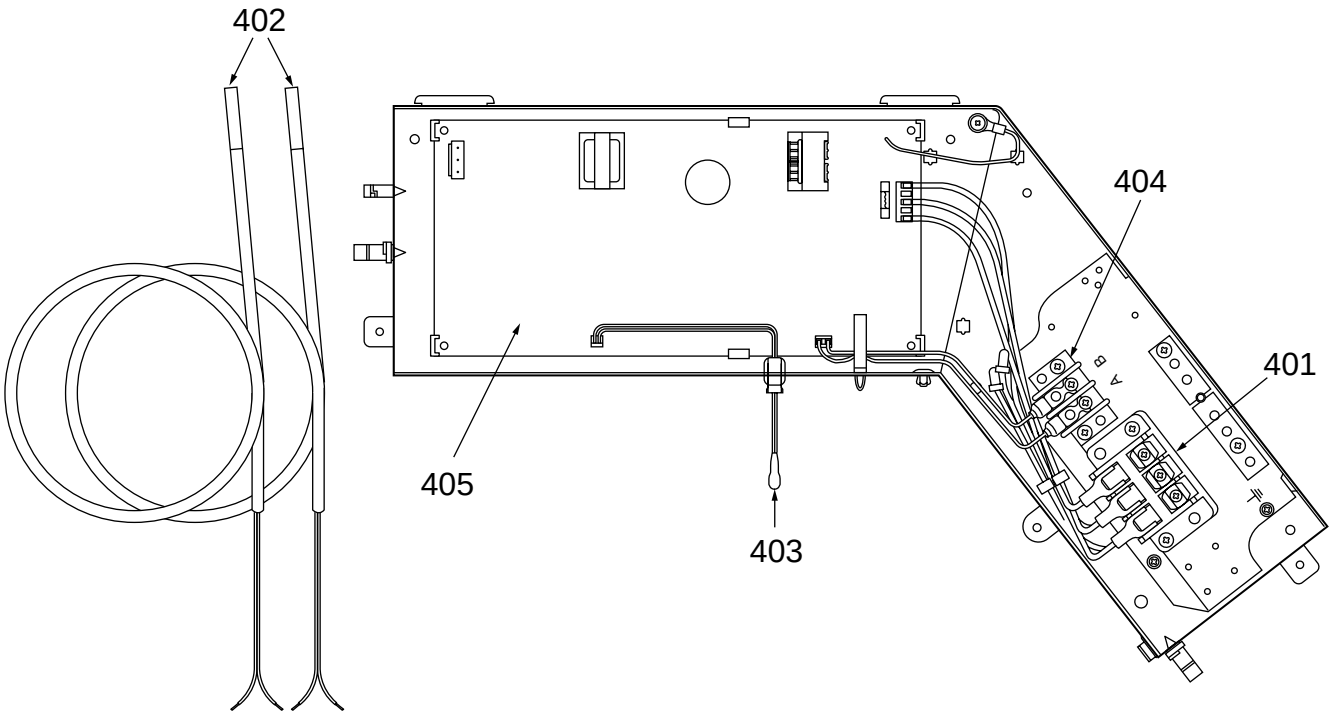
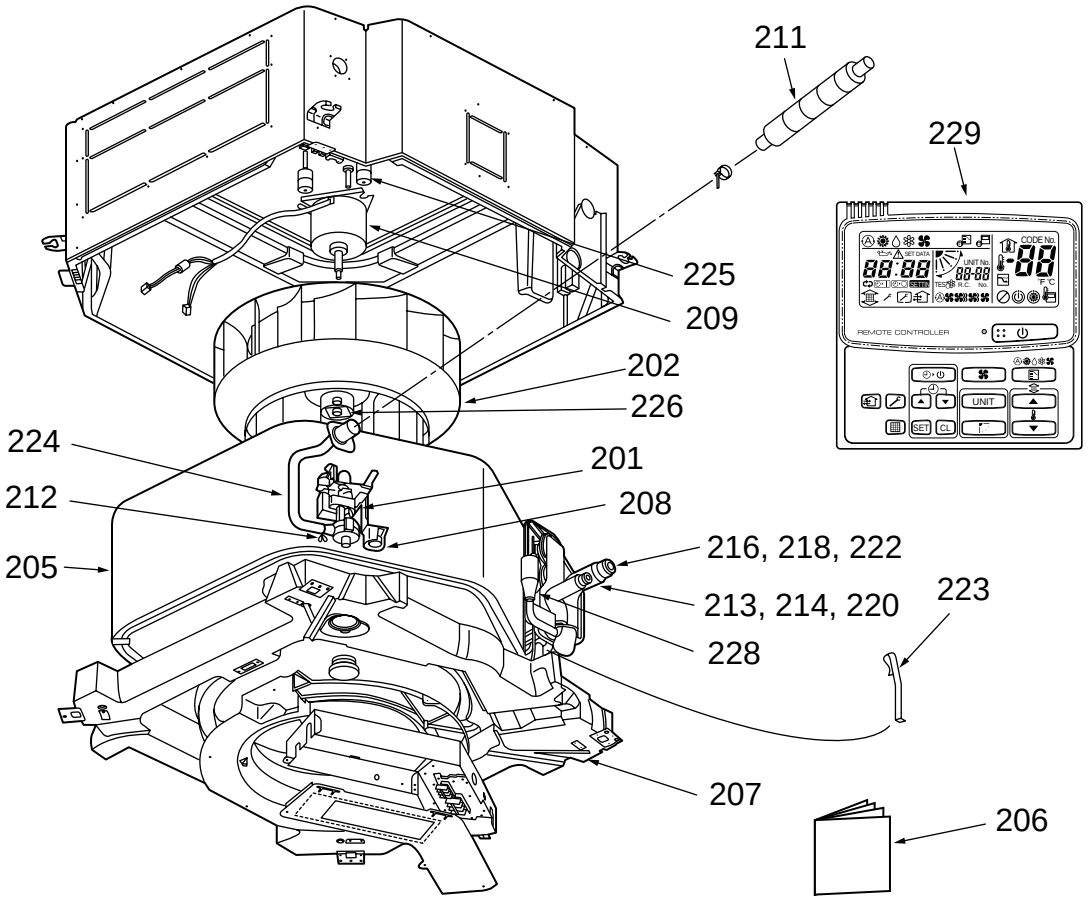


Location No.	Part	Description
401	43060750	Terminal Block, 3P
402	43050382	Sensor, TC (F6)
403	43150297	Sensor, TC
404	43160445	Terminal Block, 2P, 1A, AC30V
405	4316V188	P.C. Board Ass'y, MMC-1402

Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SP1100UT-E (A03-014)



Location No.	Part	Description
201	43121703	Pump, Drain, ADP-1409, 220-240V
202	43120214	Fan, Ass'y Turb, TY461
205	4314J124	Refrigeration Cycle Ass'y
206	4318T313	Owner's Manual
207	43172160	Pan Ass'y, Drain, PS-F+ABS, Sheet
208	43151279	Switch, Float, FS-0218-106
209	43121691	Motor, Fan, SWF-200-90-1
211	43170232	Hose, Drain, 25A
212	43079249	Band, Hose
213	43047546	Nut, Flare, 3/8 IN, Ø9.6
214	43194026	Socket, Ø9.6

Location No.	Part	Description
216	43194078	Nut, Flare, 5/8 IN, Ø15.9
218	43194079	Socket, 5/8 IN, Ø15.9
220	43047609	Bonnet, Ø9.6
222	43194029	Bonnet, Ø15.9
223	43019904	Holder, Sensor, SUS
224	43170231	Hose, Drain
225	43139137	Rubber, Cushion
226	43097204	Nut
228	43147653	Distributor Ass'y
229	4316V194	Remote Controller, SX-A3JE
230	4316V195	Remote Controller, SX-A11JE
231	4316V196	Remote Controller, EX-W2JE
232	4316V197	Remote Controller, WH-H1JE

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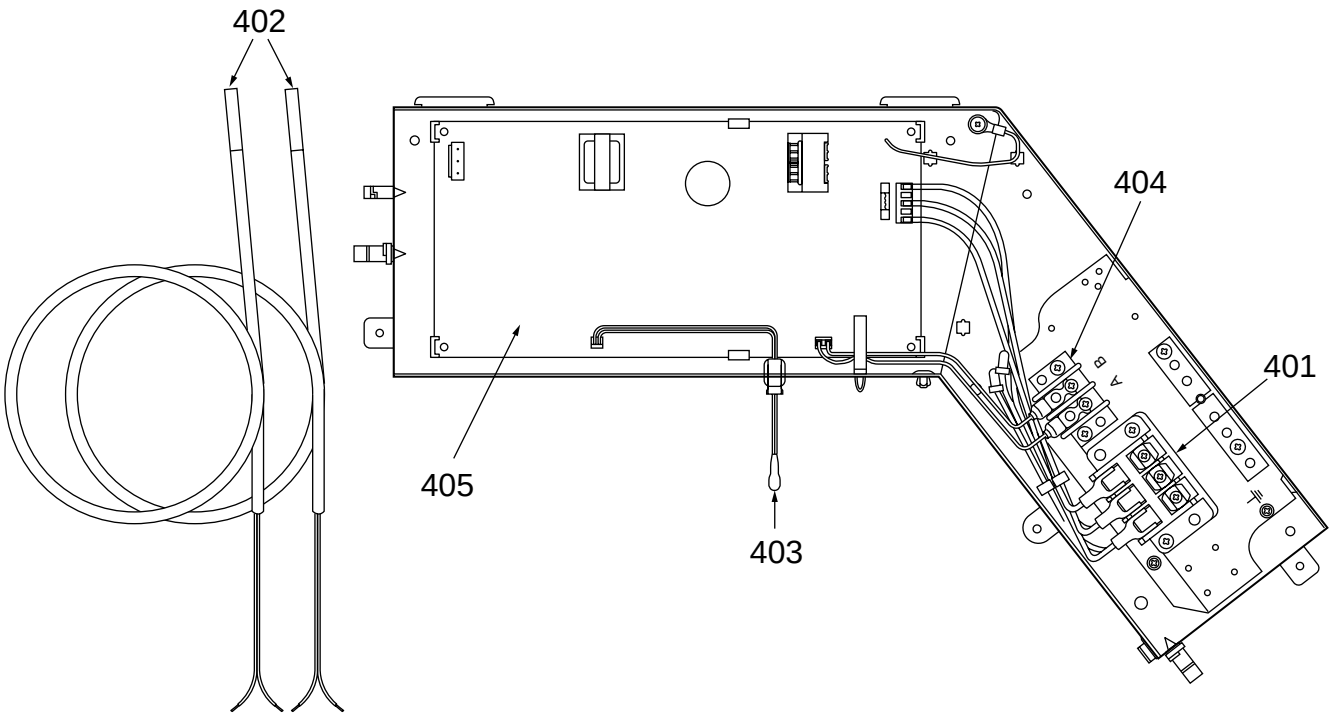
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy



Location No.	Part	Description
401	43060750	Terminal Block, 3P
402	43050382	Sensor, TC (F6)
403	43150297	Sensor, TA
404	43160445	Terminal Block, 2P, 1A, AC30V
405	4316V220	P.C. Board Ass'y, MMC-1402 (220–240V)

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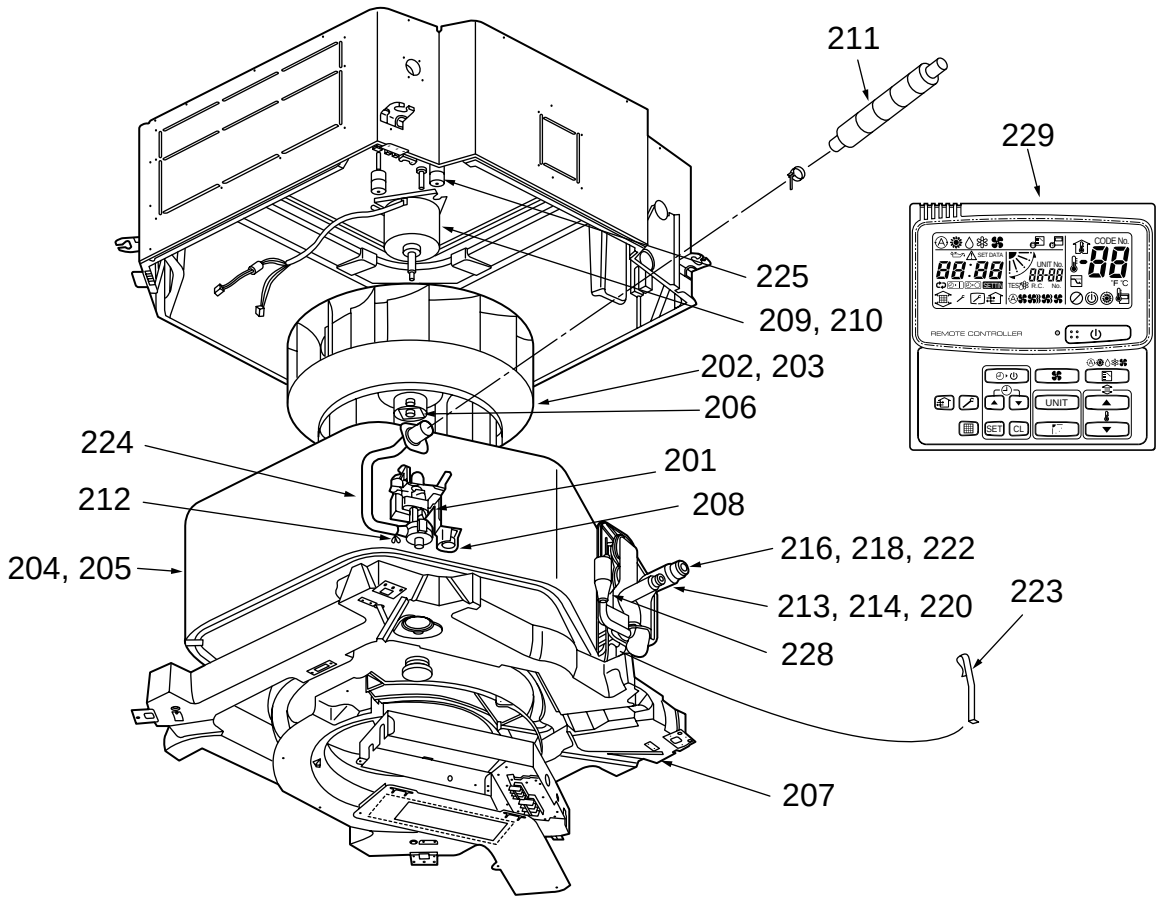
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM1100UT-E, RAV-SM1400UT-E (A03-003)



Location No.	Part	Description
201	43121703	Pump, Drain, ADP-1409, 220-240V
202	43120214	Fan, Ass'y Turb, TY461 (SM1400UT-E)
203	43120215	Fan, Ass'y Turb, TJ461 (SM1100UT-E)
204	4314J123	Refrigeration Cycle Ass'y (SM1100UT-E)
205	4314J124	Refrigeration Cycle Ass'y (SM1400UT-E)
206	4318T313	Owner's Manual
207	43172160	Pan Ass'y, Drain, PS-F+ABS, Sheet
208	43151279	Switch, Float, FS-0218-106
209	43121691	Motor, Fan, SWF-200-90-1 (SM1400UT-E)
210	43121692	Motor, Fan, SWF-230-60-1 (SM1100UT-E)
211	43170232	Hose, Drain, 25A

Location No.	Part	Description
212	43079249	Band, Hose
213	43047546	Nut, Flare, 3/8 IN, Ø9.62
214	43194026	Socket, Ø9.62
216	43194078	Nut, Flare, 5/8 IN, Ø15.88
218	43194079	Socket, 5/8 IN, Ø15.88
220	43047609	Bonnet, Ø9.62
222	43194029	Bonnet, Ø15.88
223	43019904	Holder, Sensor, SUS
224	43170231	Hose, Drain
225	43139137	Rubber, Cushion
226	43097204	Nut
228	43147657	Distributor Ass'y (SM1100UT-E)
229	4316V194	Remote Controller, SX-A3JE
230	4316V195	Remote Controller, SX-A11JE
231	4316V196	Remote Controller, EX-W2JE
232	4316V197	Remote Controller, WH-H1JE

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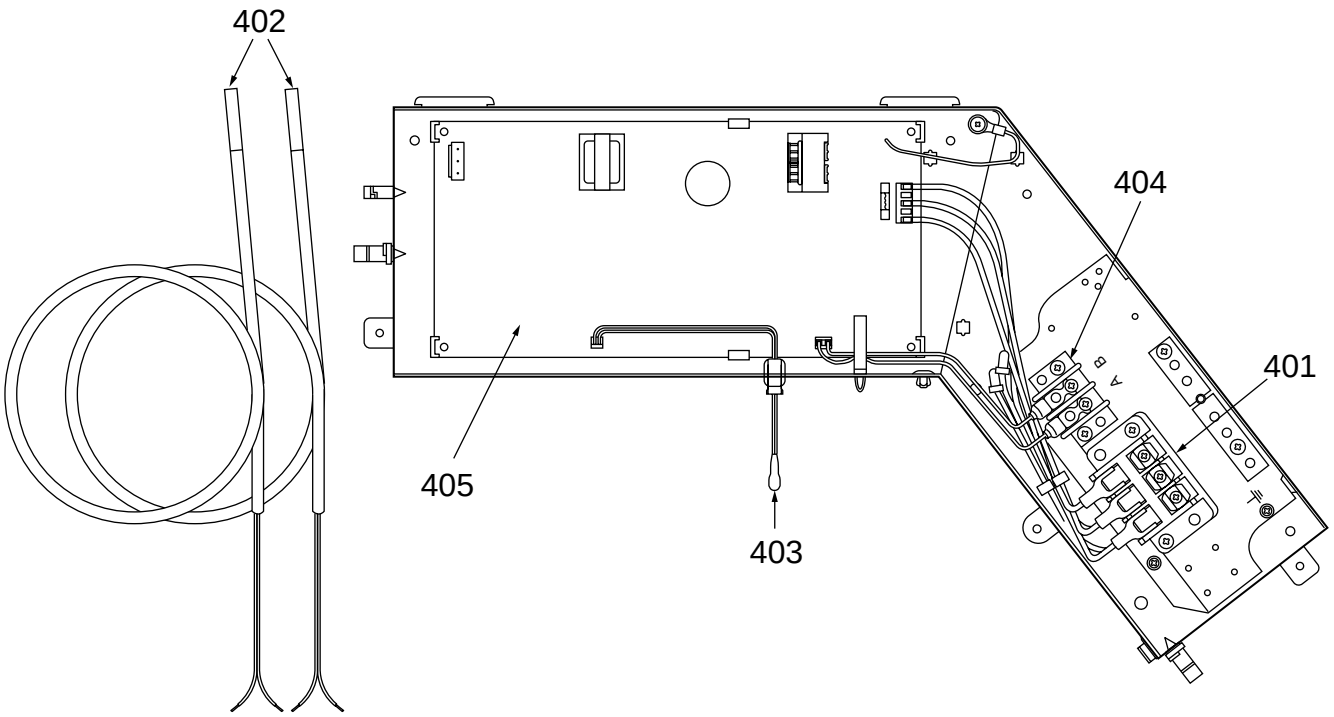
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy



Location No.	Part	Description
401	43060750	Terminal Block, 3P
402	43050382	Sensor, TC (F6)
403	43150297	Sensor, TC
404	43160445	Terminal Block, 2P, 1A, AC30V
405	4316V220	P.C. Board Ass'y, MMC-1402 (220–240V)

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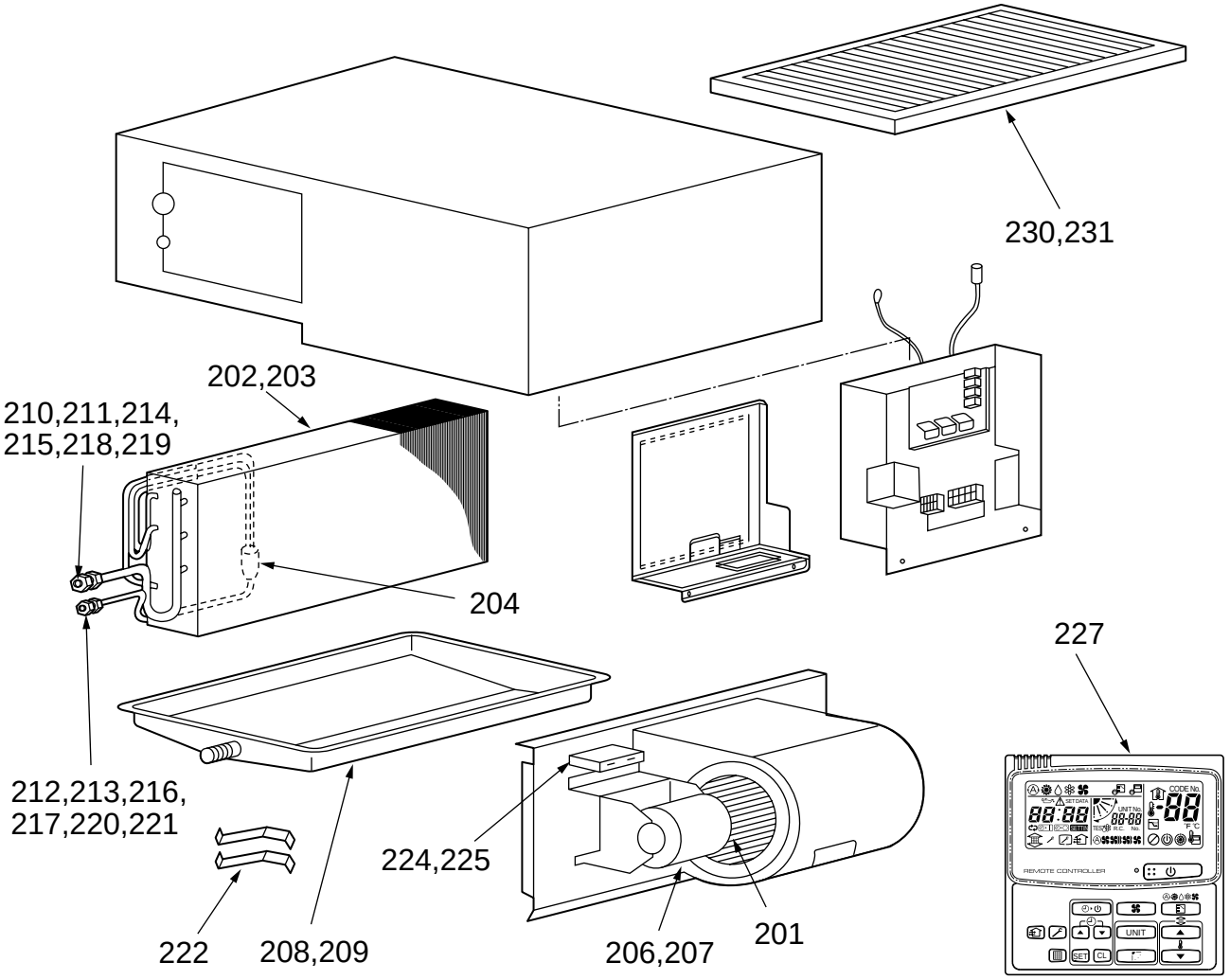
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

15-1-2. Built-in Type

RAV-SM560BT-E, RAV-SM800BT-E (A02-014)



Location No.	Part	Description
201	43120149	Fan, Multi Blade
202	4314J100	Refrigeration Cycle Ass'y
203	4314J101	Refrigeration Cycle Ass'y
204	43147654	Distributor Ass'y
205	43147655	Distributor Ass'y
206	43121643	Motor, Fan
207	43121645	Motor, Fan
208	43191304	Drain Ass'y
209	43191305	Pan, Drain
210	43047545	Nut, Flare, 1/4 IN, Ø6.35
211	43047546	Nut, Flare, 3/8 IN, Ø9.52
212	43194081	Nut, Flare, 1/2 IN, Ø12.7
213	43194078	Nut, Flare, 5/8 IN, Ø15.88
214	43194051	Socket, Ø6.35
215	43194026	Socket, Ø9.52
216	43194080	Socket, 1/2 IN, Ø12.7
217	43194079	Socket, 5/8 IN, Ø15.88

Location No.	Part	Description
218	43049697	Bonnet, Ø6.35
219	43047609	Bonnet, Ø9.52
220	43147195	Bonnet, 1/2 IN, Ø12.7
221	43194029	Bonnet, Ø15.88
222	43019822	Holder, Sensor, SUS
223	43160394	Connector, 9P
224	43155088	Capacitor, Electrolytic, 2.5MFD, 500V
225	43155096	Capacitor, Electrolytic, 5MFD, 400V
226	43121688	Pump, Drain, PJD-05230TF, 220-240V 50/60Hz
227	4316V194	Remote Controller, SX-A3JE
228	4316V195	Remote Controller, SX-A11JE
229	4316V196	Remote Controller, WX-W2JE
230	43119462	Filter (SM560BT-E)
231	43119463	Filter (SM800BT-E)

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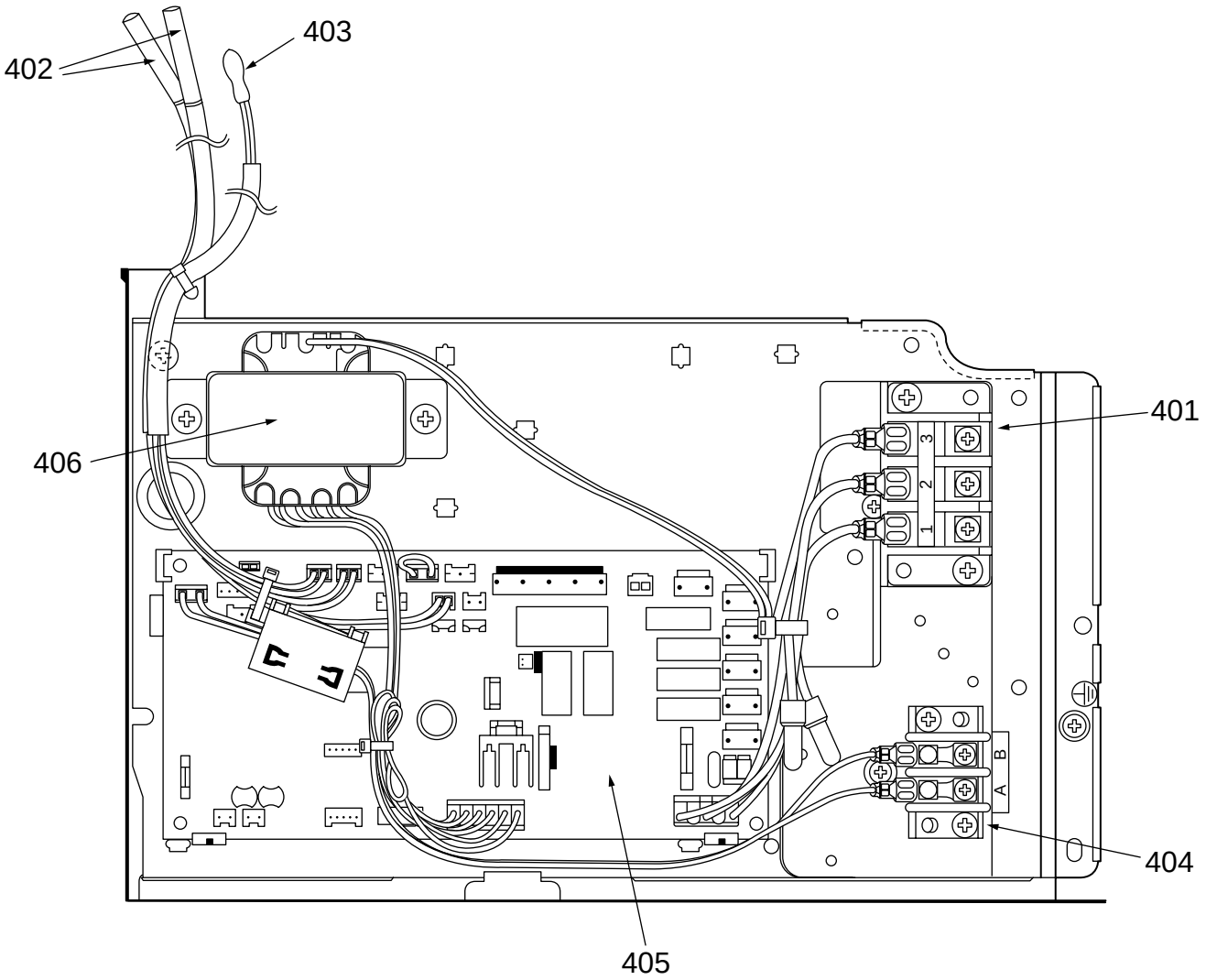
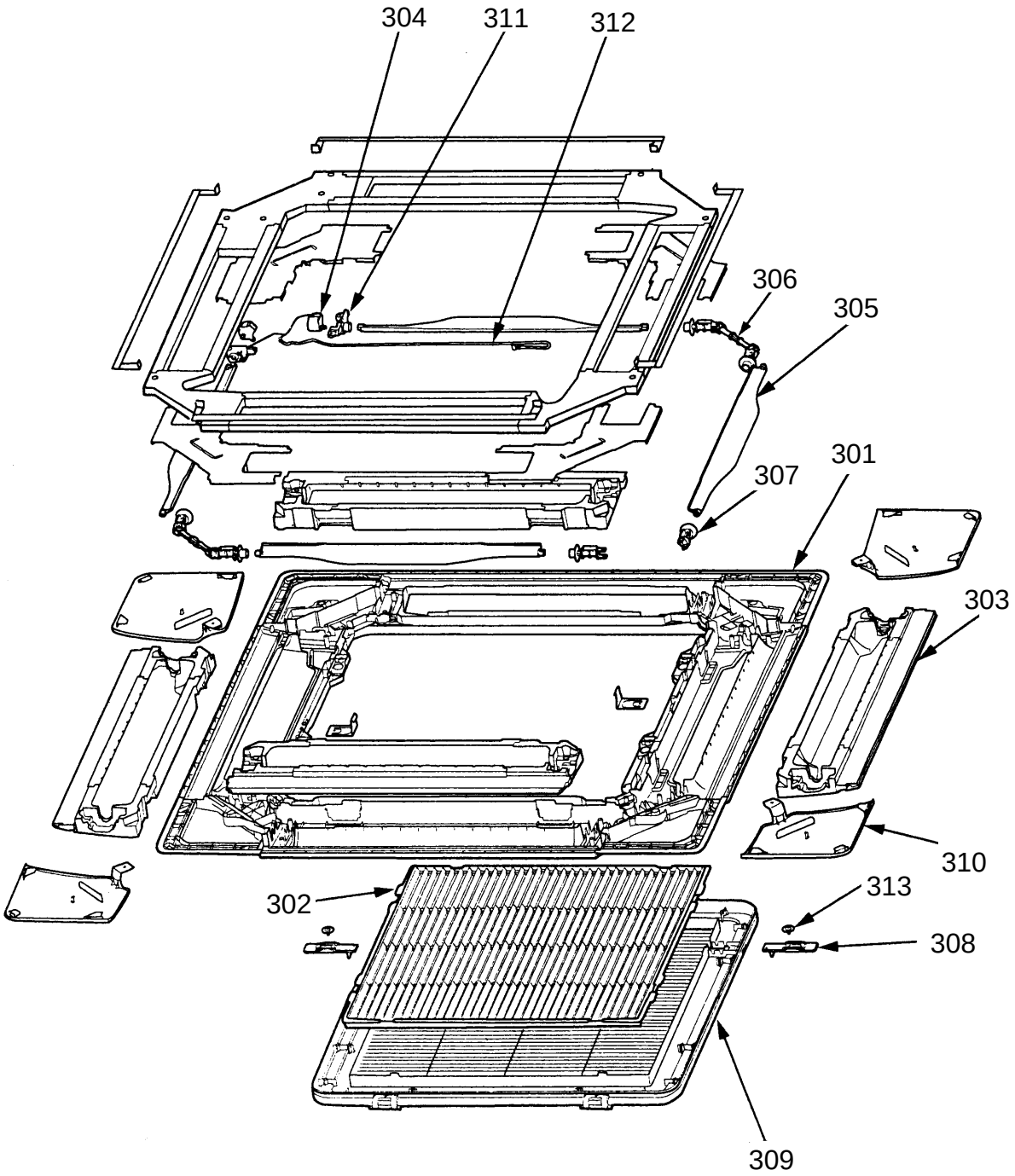


Location No.	Part	Description
401	43060750	Terminal Block, 3P
402	43050382	Sensor, TC (F6)
403	43150299	Sensor, TA
404	43160445	Terminal Block, 2P, 1A, AC30V
405	4316V189	P.C. Board Ass'y, MCC-1403 (220-240V)
406	43158180	Transformer, TT-09 (AC220-240V)

Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RBC-U21PG (W) - E



Location No.	Part	Description
301	43409164	Panel, PS-HI100
302	43480010	Air Filter, ABS
303	43407120	Outlet, Air Form, PS-F
304	4302C029	Motor, Louver, MP24GA
305	43409173	Louver, ABS
306	43422001	Joint, Kit
307	43422002	Joint, Kit

Location No.	Part	Description
308	43407116	Grille, Catch, ABS
309	43409168	Grille, Air, Inlet
310	43409182	Cover, Panel Ass'y, PS-HI100
311	43407123	Fix, Motor, ABS
312	43460108	Lead, Motor
313	43482025	Washer, SPCC

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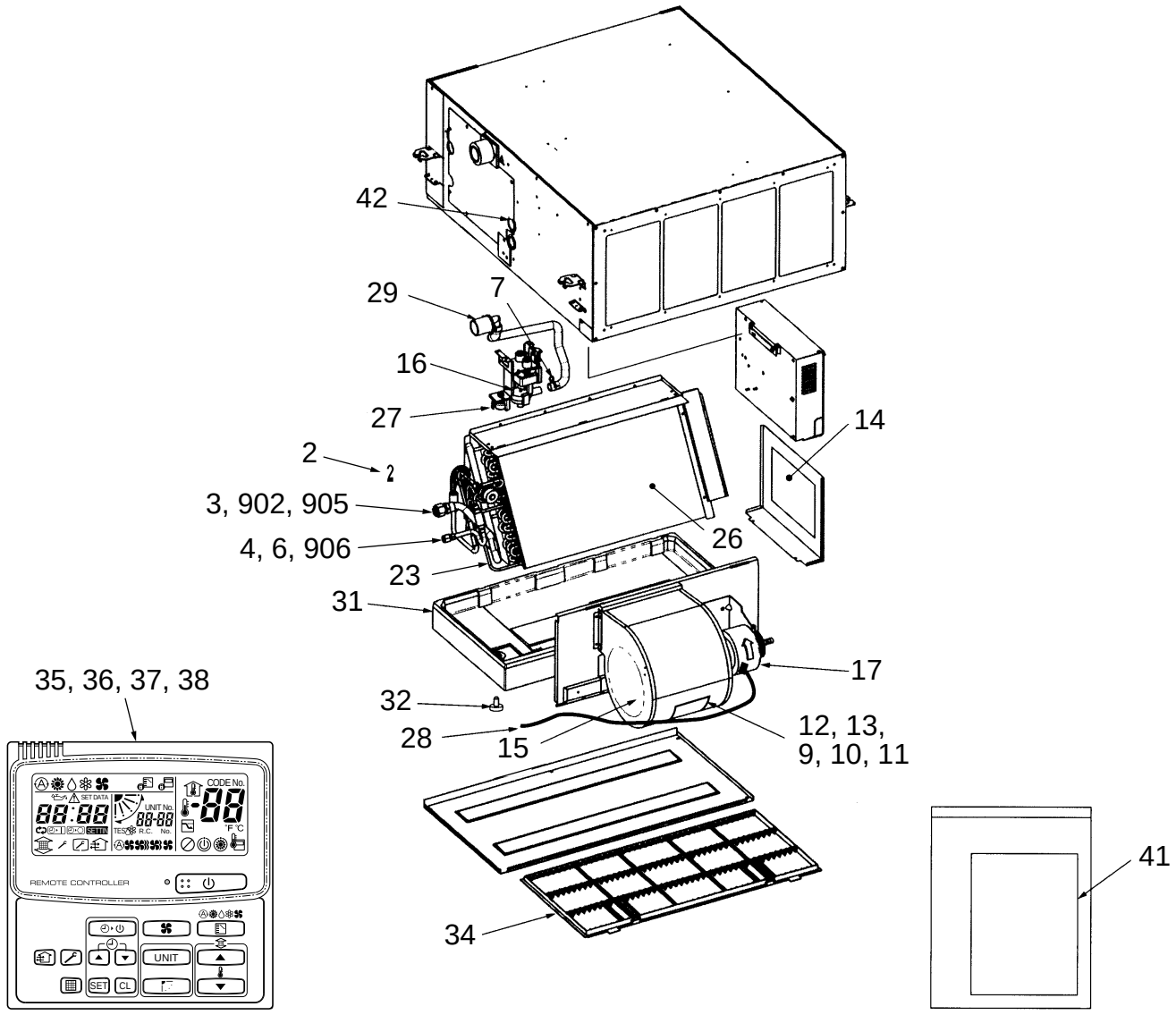
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

15-1-3. Concealed Duct Type

RAV-SM561BT-E (A03-007)



Location No.	Part	Description
2	43019904	Holder, Sensor
3	43047303	Bonnet
4	43047545	Nut, Flare, 1/4 IN
6	43049697	Band, Hose
7	43079249	Band, Hose
15	43120220	Fan, Multi Blade
16	43121713	Pump Ass'y, Drain
17	43121708	Motor, Fan
23	43147710	Distributor Ass'y
26	4314J182	Refrigeration cycle Ass'y
27	43151281	Switch, Float
28	43160553	Lead, Motor, Fan
29	43170233	Hose, Drain

Location No.	Part	Description
31	43172168	Pan Ass'y, Drain
32	43179110	Plug
34	43180311	Air Filter
35	4316V194	Remote Controller
36	4316V195	Remote Controller
37	4316V196	Remote Controller
38	4316V197	Remote Controller
41	4318T458	Owner's Manual
42	43196012	Bushing
902	43194051	Soket
905	43194081	Nut, Flare, 1/2, IN
906	43194080	Soket

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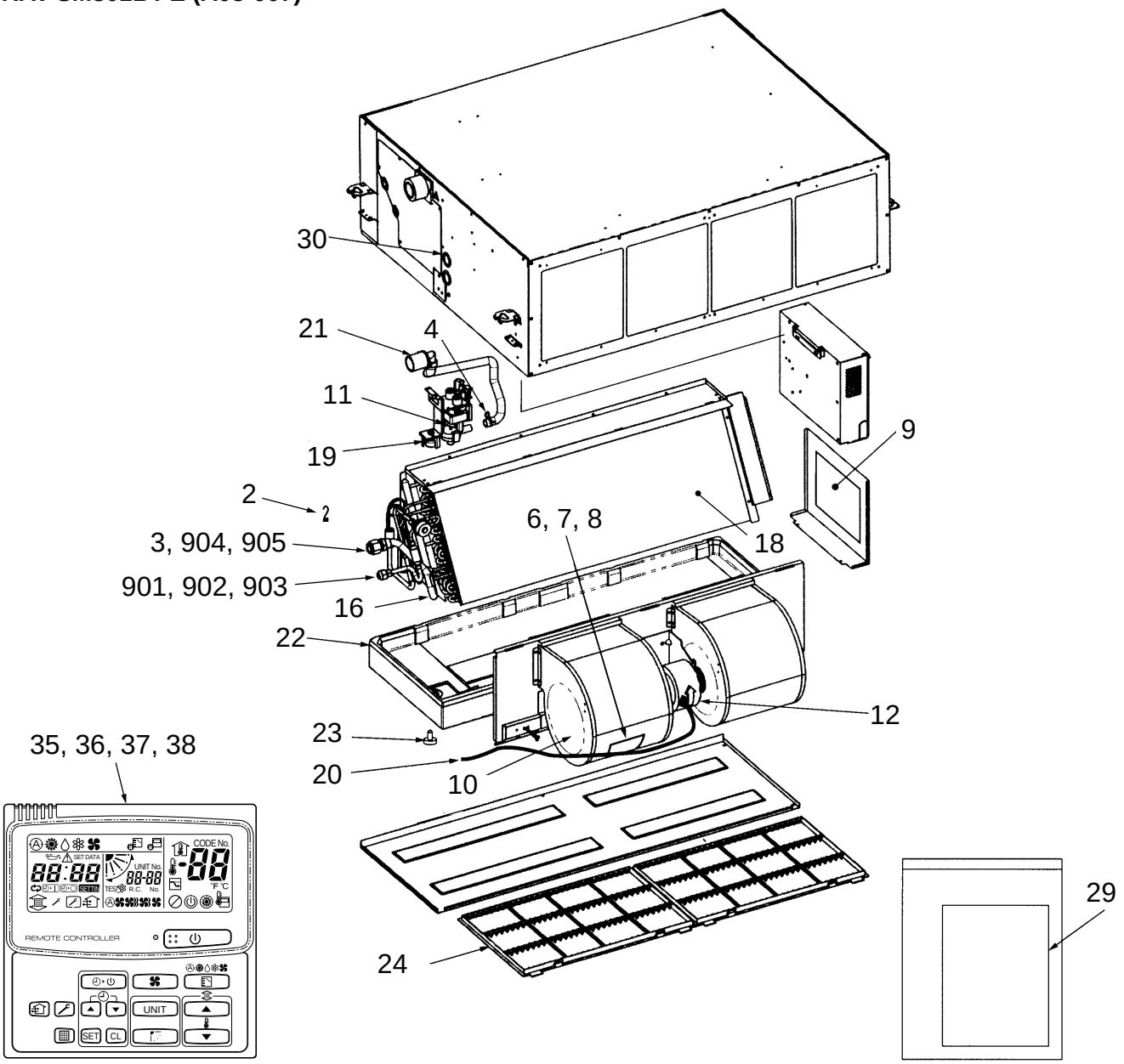
RAV-SM801BT-E (A03-007)

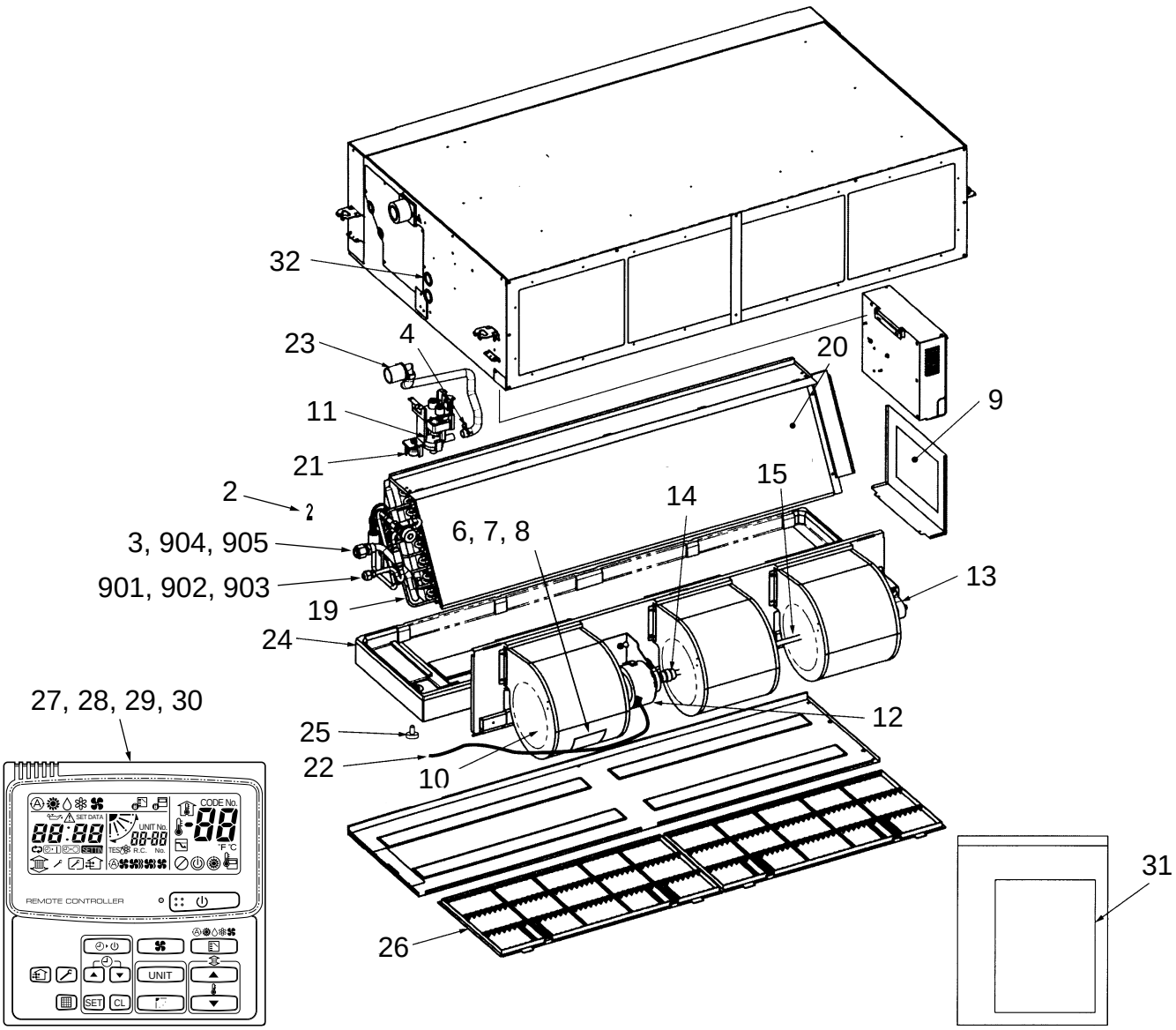


Location No.	Part	Description
2	43019904	Holder, Sensor
3	43047609	Bonnet
4	43079249	Band, Hose
10	43120220	Fan, Multi Blade
11	43121713	Pump Ass'y, Drain
12	43121707	Motor, Fan
16	4314J176	Distributor Ass'y
18	4314J183	Refrigeration cycle Ass'y
19	43151281	Switch, Float
20	43160553	Lead, Motor, Fan
21	43170233	Hose, Drain
22	43172167	Pan Ass'y, Drain
23	43179110	Plug

Location No.	Part	Description
24	43180312	Air Filter
29	4318T458	Owner's Manual
30	43196012	Bushing
35	4316V194	Remote Controller
36	4316V195	Remote Controller
37	4316V196	Remote Controller
38	4316V197	Remote Controller
901	43194026	Soket
902	43194029	Bonnet
903	43194055	Nut, Flare, 3/8, IN
904	43194078	Nut, Flare, 5/8, IN
905	43194079	Soket

Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM1101BT-E, RAV-SM1401BT-E (A03-007)



Location No.	Part	Description
2	43019904	Holder, Sensor
3	43047609	Bonnet
4	43079249	Band, Hose
10	43120220	Fan, Multi Blade
11	43121713	Pump Ass'y, Drain
12	43121708	Motor, Fan
13	43125135	Bearing, Shaft
14	43125155	Coupling
15	43125156	Shaft
19	4314J177	Distributor Ass'y
20	4314J184	Refrigeration cycle Ass'y
21	43151281	Switch, Float
22	43160553	Lead, Motor, Fan
23	43170233	Hose, Drain

Location No.	Part	Description
24	43172166	Pan Ass'y, Drain
25	43179110	Plug
26	43180311	Air Filter
27	4316V194	Remote Controller
28	4316V195	Remote Controller
29	4316V196	Remote Controller
30	4316V197	Remote Controller
31	4318T458	Owner's Manual
32	43196012	Bushing
901	43194026	Soket
902	43194029	Bonnet
903	43194055	Nut, Flare, 3/8, IN
904	43194078	Nut, Flare, 5/8, IN
905	43194079	Soket

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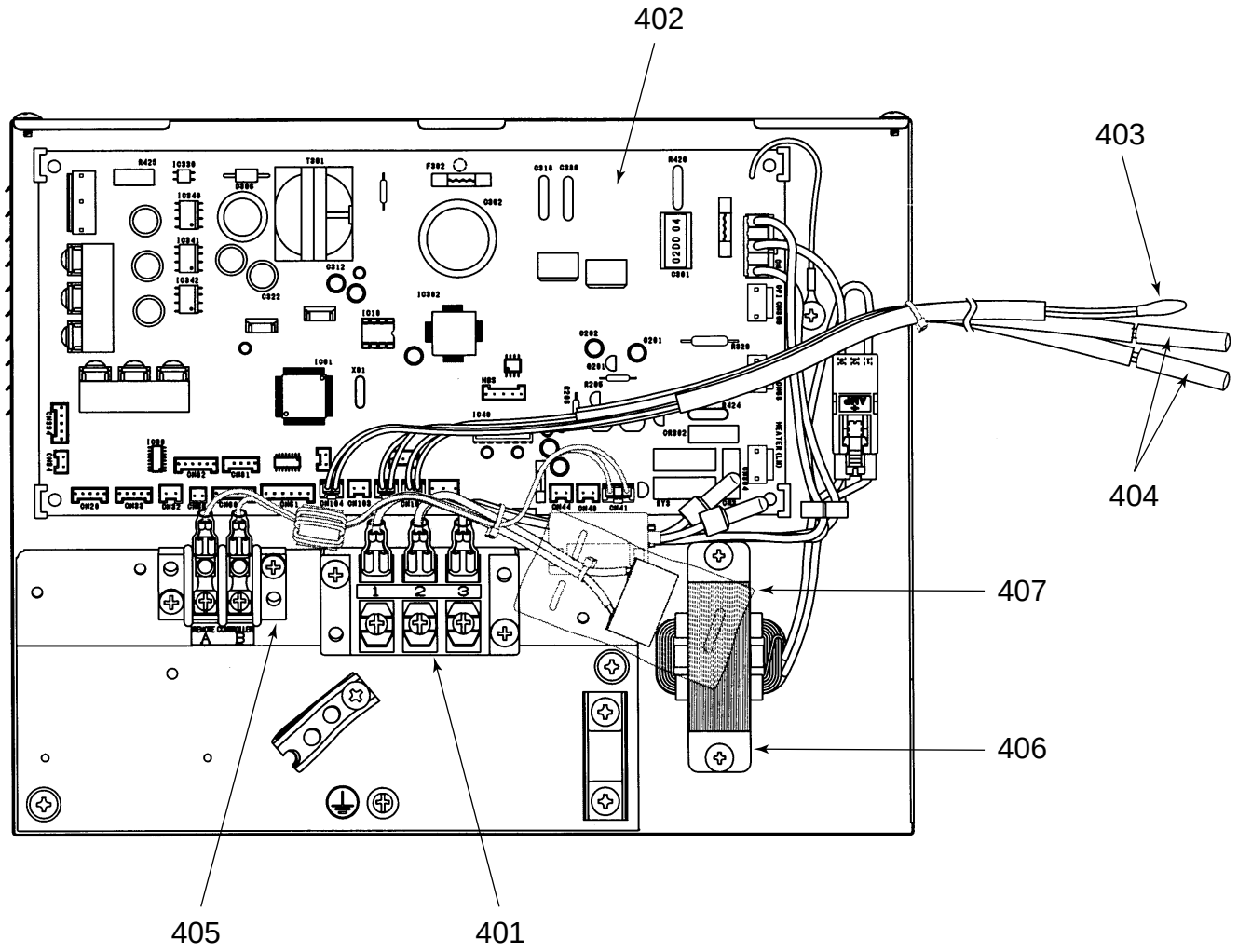
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM561BT-E, RAV-SM801BT-E, RAV-SM1101BT-E, RAV-SM1401BT-E (A03-007)



Location No.	Part	Description
401	43060750	Terminal Block, 3P
402	4316V226	P.C. Board Ass'y, MMC-1402
403	43050382	Sensor, TC (F6)
404	43150297	Sensor, TC

Location No.	Part	Description
405	43160445	Terminal Block, 2P
406	43158184	Reactor
407	43155192	Capacitor

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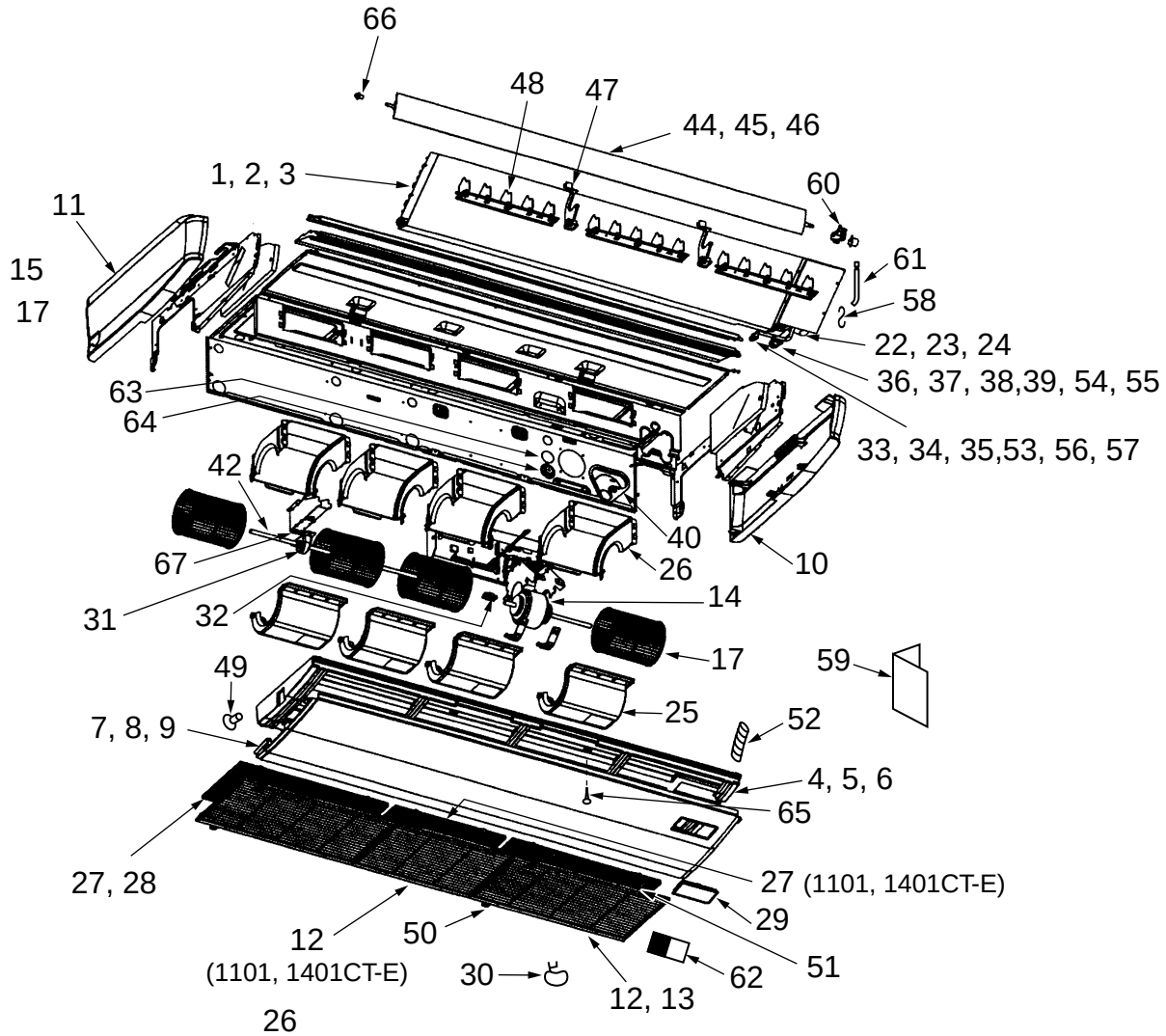
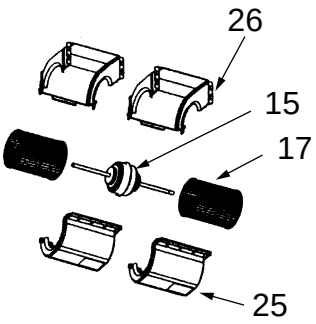
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

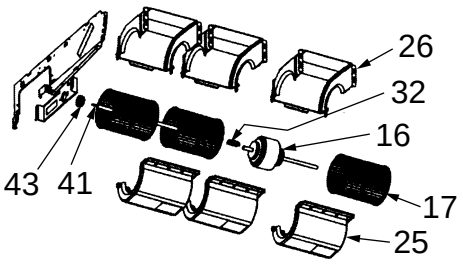
15-1-4. Under Ceiling Type

RAV-SM561CT-E, RAV-SM801CT-E, RAV-SM1101CT-E, RAV-SM1401CT-E (A03-016)

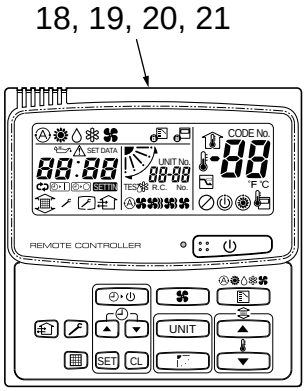




RAV-SM561CT-E
(Fan assembly)



RAV-SM801CT-E
(Fan assembly)



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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

Location No.	Part	Description
1	4314J198	Refrigeration cycle Ass'y (SM561CT)
2	4314J187	Refrigeration cycle Ass'y (SM801CT)
3	4314J188	Refrigeration cycle Ass'y (SM1101CT, SM1401CT)
4	43172173	Pan Drain Ass'y (SM561CT)
5	43172174	Pan Drain Ass'y (SM801CT)
6	43172175	Pan Drain Ass'y (SM1101CT, SM1401CT)
7	43191663	Panel, Under (SM561CT)
8	43191664	Panel, Under (SM801CT)
9	43191665	Panel, Under (SM1101CT, SM1401CT)
10	43102647	Cover Ass'y, Right Side
11	43102648	Cover Ass'y, Left Side
12	43109407	Grille, Inlet (SM561CT, SM1101CT, SM1401CT)
13	43109408	Grille, Inlet (SM801CT, SM1101CT, SM1401CT)
14	43121714	Motor, Fan, SWF-280-120-2, 120W (SM1101CT, SM1401CT)
15	43121715	Motor, Fan, SWF-280-60-1, 60W (SM561CT)
16	43121716	Motor, Fan, SWF-280-60-2, 60W (SM801CT)
17	43120222	Fan, Multi Blade
18	4316V194	Remote Controller, SX-A3JE
19	4316V195	Remote Controller, SX-A11JE
20	4316V196	Remote Controller, EX-W2JE
21	4316V197	Remote Controller, WH-H1JE
22	43147700	Distributor Ass'y (SM561CT)
23	43147701	Distributor Ass'y (SM801CT)
24	43147702	Distributor Ass'y (SM1101CT, SM1401CT)
25	43122084	Case, Fan, Lower
26	43122085	Case, Fan, Upper
27	43180314	Air Filter (SM561CT, SM1101CT, SM1401CT)
28	43180315	Air Filter (SM801CT, SM1101CT, SM1401CT)
29	43108014	Base, Receiver
30	43179130	Band, Hose
31	43125131	Bearing, Shaft (SM1101CT, SM1401CT)
32	43125155	Coupling (SM801CT, SM1101CT, SM1401CT)

Location No.	Part	Description
33	43047545	Nut, Flare, 1/4 IN (SM561CT)
34	43194026	Socket (SM801CT, SM1101CT, SM1401CT)
35	43194051	Socket (SM561CT)
36	43194081	Nut, Flare, 1/2 IN (SM561CT)
37	43194078	Nut, Flare, 5/8 IN (SM801CT, SM1101CT, SM1401CT)
38	43194080	Socket, 1/2 IN (SM561CT)
39	43194079	Socket, 5/8 IN (SM801CT, SM1101CT, SM1401CT)
40	43149326	Cover, Back Base
41	43125157	Shaft, SS400B-D2 12 (SM801CT)
42	43125158	Shaft, SS400B-12 DIA (SM1101CT, SM1401CT)
43	43125159	Bearing (SM801CT)
44	43109409	Grille Ass'y, Horizontal (SM561CT)
45	43109410	Grille Ass'y, Horizontal (SM801CT)
46	43109411	Grille Ass'y, Horizontal (SM1101CT, SM1401CT)
47	43107253	Support, Grille Horizontal
48	43122086	Grille Ass'y, Vertical
49	43179129	Cap Drain
50	43107254	Hinge, Grille Inlet
51	43107255	Hook, Grille Inlet
52	43170234	Hose, Drain
53	43047609	Bonnet (SM801CT, SM1101CT, SM1401CT)
54	43047303	Bonnet (SM561CT)
55	43194029	Bonnet (SM801CT, SM1101CT, SM1401CT)
56	43194055	Nut, Flare, 3/8 IN (SM801CT, SM1101CT, SM1401CT)
57	43049697	Bonnet (SM561CT)
58	43019904	Holder, Sensor
59	4318T491	Owner's Manual
60	43121719	Driver Ass'y, Horizontal L Louver
61	43160556	Lead, Louver Horizontal
62	43108016	Mark TOSHIBA
63	43162049	Bushing, 50DIA
64	43162050	Bushing, 56DIA
65	43197163	Screw, Fix Drain Pan
66	43107252	Shaft, Horizontal Louver
67	43139151	Spacer, Bearing (SM1101CT, SM1401CT)

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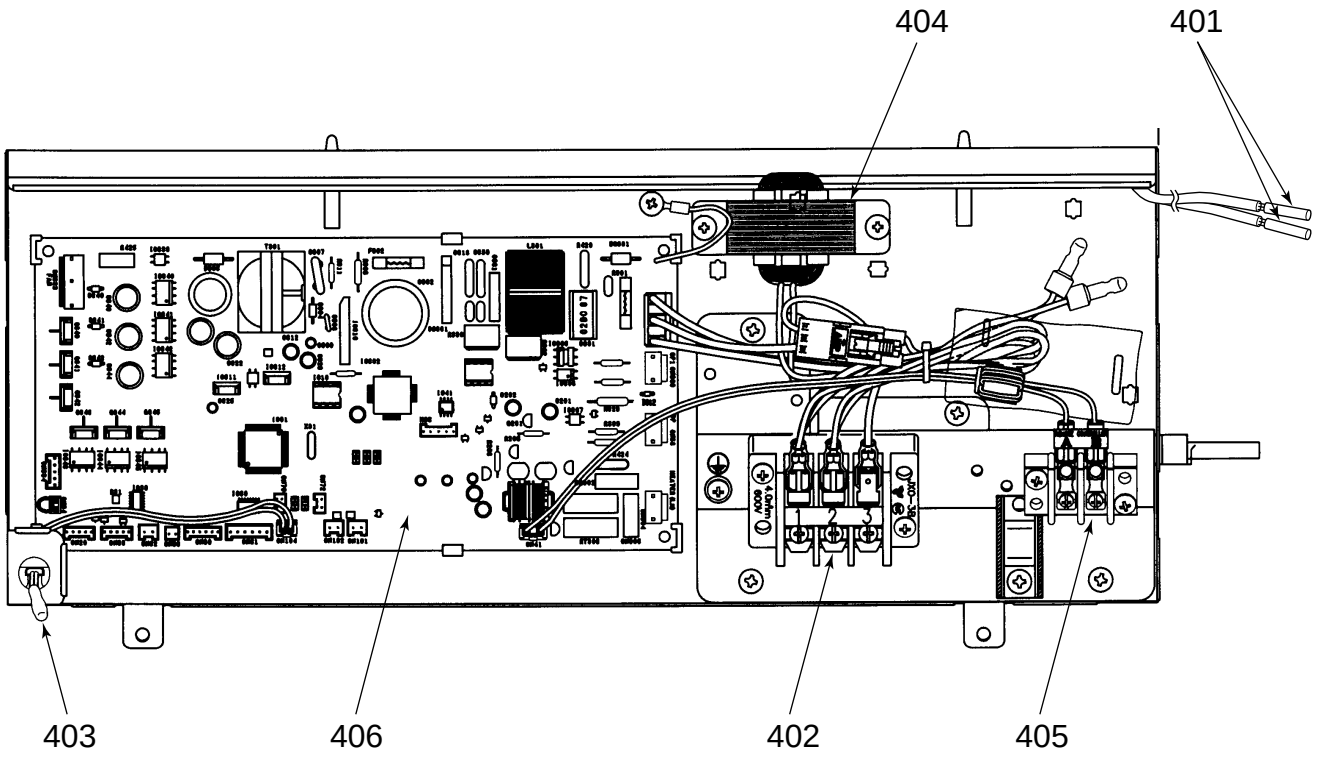
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy



Location No.	Part	Description
401	43050382	Sensor, TC (F6)
402	43060750	Terminal Block, 3P
403	43150297	Sensor, TA

Location No.	Part	Description
404	43158184	Reactor
405	43160445	Terminal Block, 2P
406	4316V230	P.C. Board Ass'y, MMC-1402

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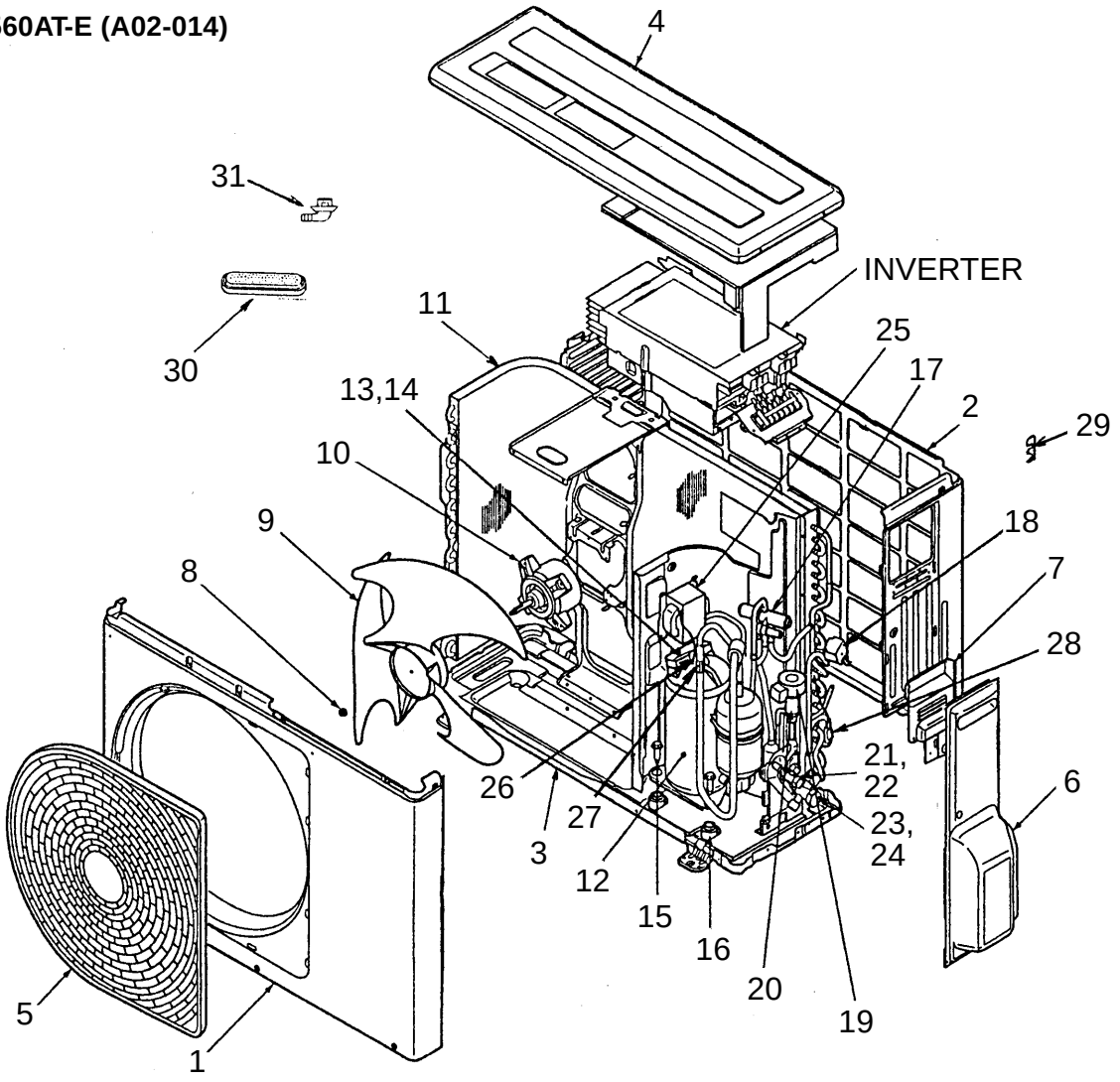
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

15-2. Outdoor Unit

RAV-SM560AT-E (A02-014)



Location No.	Part	Description
1	43105037	Cabinet, Front, PCM
2	43100239	Cabinet, Back, PCM
3	43042468	Base, Ass'y
4	43005508	Cabinet, UP, PCM
5	43119460	Guard, Fan, PP
6	43119448	Cover, Packed, Valve
7	43062230	Cover, Wiring, Ass'y
8	43047667	Nut, Flange
9	43020329	Fan, Propeller, PJ421
10	4302C033	Motor, Fan, ICF-140-43-1
11	4314G128	Condenser, Ass'y
12	43041609	Compressor, DA130A1F-23F
13	43050407	Thermostat, Bimetal
14	43063317	Holder, Thermostat
15	43097206	Bolt, Compressor, M6
16	43049749	Rubber, Cushion
17	43046363	Valve, 4-WAY, VT7101D

Location No.	Part	Description
18	43146617	Solenoid, Coil, LB64045
19	43046385	Valve, Pulse, Modulating, SKV-18D26
20	43046394	Coil, PMV, DKV-MOZS744BO
21	43046392	Valve, Packed, 6.35, AO
22	43147195	Bonnet, 1/2 IN
23	43046393	Valve, Packed, 12.7, HKU-R410A-H4
24	43147196	Bonnet, 1/4 IN, 6.4 CU
25	43055521	Reactor, CH-57
26	43063321	Holder, Sensor, 4-8, 9.52
27	43063322	Holder, Sensor, 6-11.4, 12.7
28	43063325	Holder, Sensor, 6-6.35, 8
29	43063332	Holder, Sensor
30	43089160	Cap, Waterproof
31	43032441	Nipple, Drain

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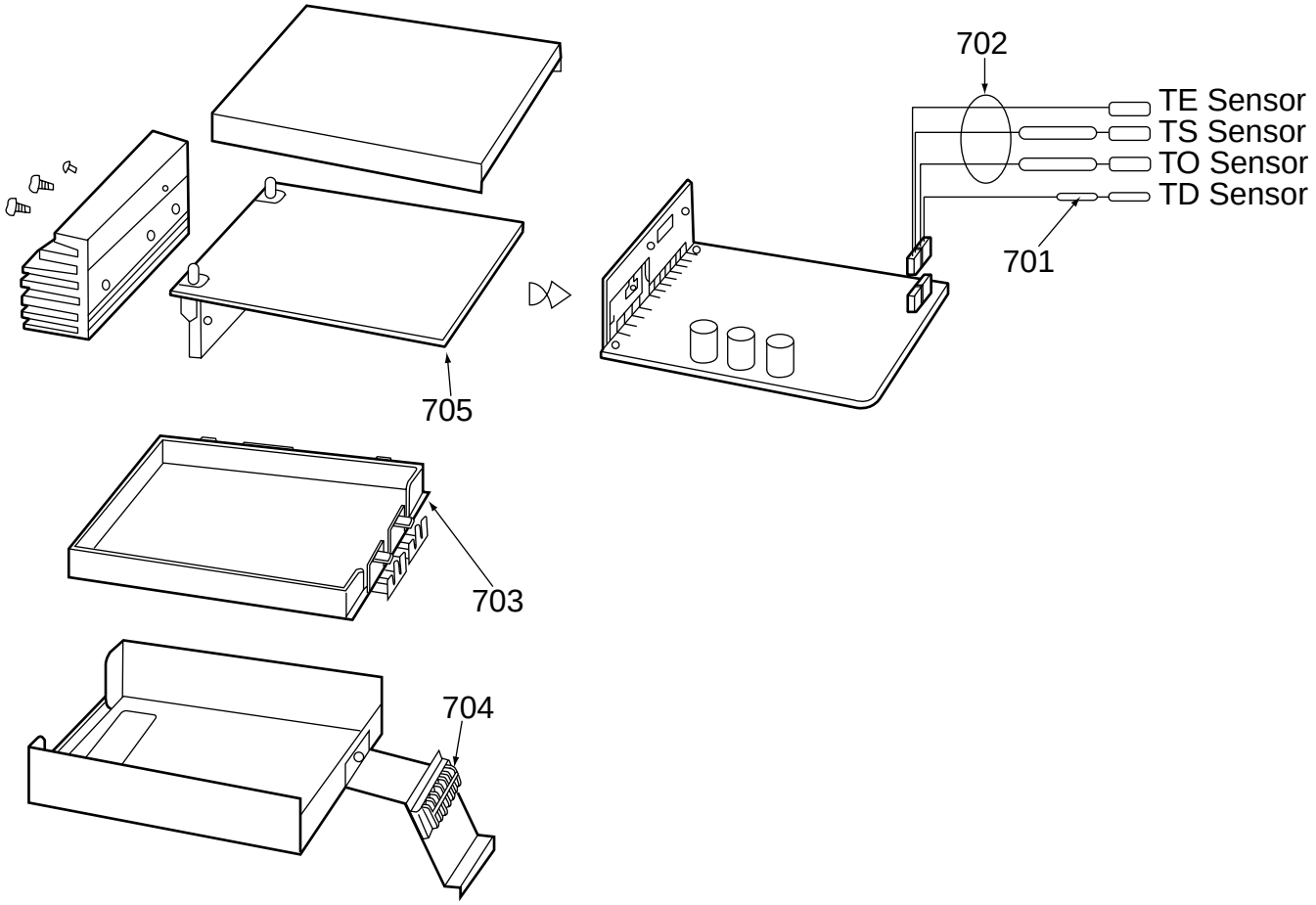
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy



Location No.	Part	Description
701	43050334	Sensor, TD (F4), TD Sensor
702	43050382	Sensor, TC (F6), TC Sensor
703	43062228	Base, P.C. Board, ABS
704	43160469	Terminal Block, 6P, AC250V, 20A
706	4316V182	P.C. Board Ass'y, MCC-813

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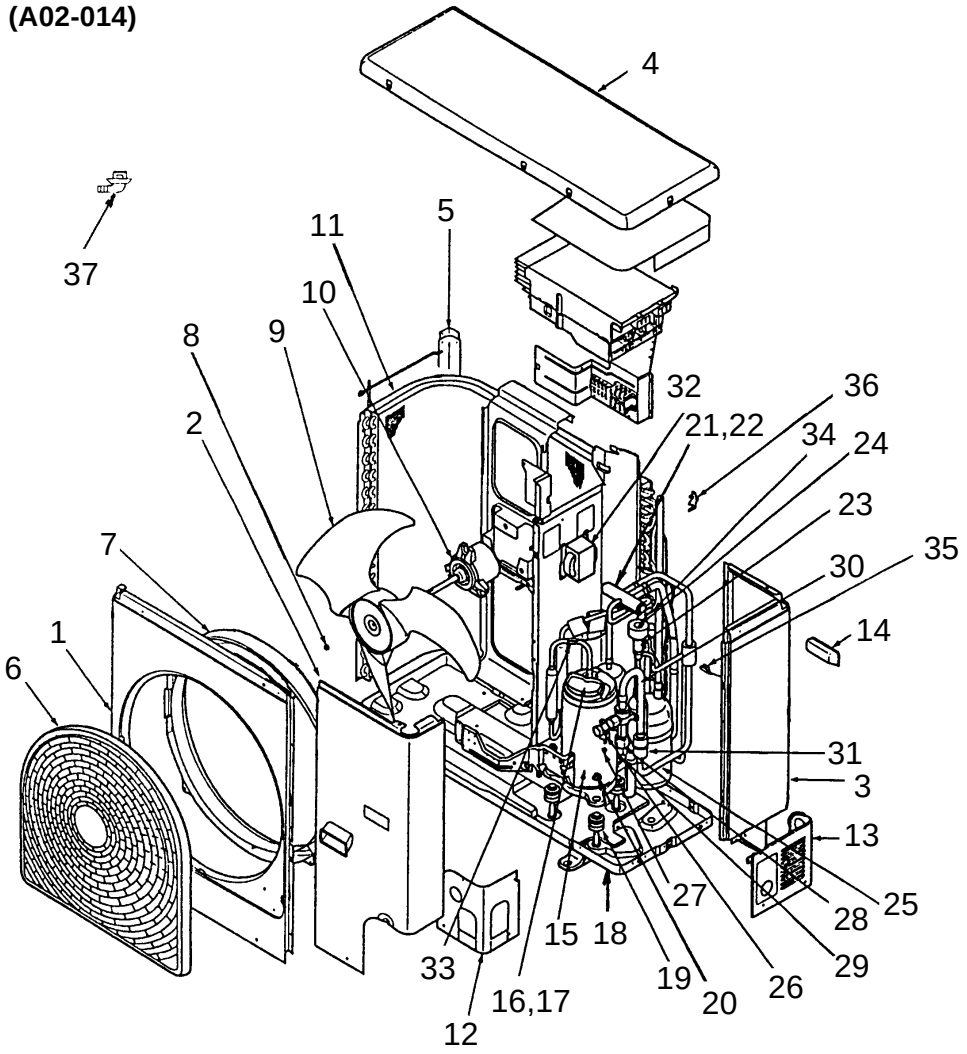
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SM800AT-E (A02-014)



Location No.	Part	Description
1	43191634	Cabinet, Air Outled
2	43191636	Cabinet, Front, Ass'y
3	43191635	Cabinet, Side, Ass'y
4	43191637	Panel, Upper
5	43005489	Guard, Fin
6	43191630	Guard, Fan, PP-K
7	43122065	Bell Mouth, Plastic
8	43047667	Nut, Flange
9	43120213	Fan, Propeller, PJ491, AS-G
10	43121693	Motor, Fan, ICF-140-63-1
11	4314G117	Condenser, Ass'y
12	43191515	Panel, Front, Piping
13	43191605	Panel, Back, Piping
14	43119390	Hanger
15	43041772	Compressor Ass'y
16	43050407	Thermostat, Bimetal
17	43063317	Holder, Thermostat
18	43005482	Base Ass'y
19	43049739	Cushion, Rubber
20	43097204	Nut
21	43046344	Valve, 4-WAY, CHV-0213

Location No.	Part	Description
22	43046348	Coil, Solenoid, VHV-01A150A1
23	43046385	Valve, Pulse, Modulating, SKV-18D26
24	43046386	Coil, PMV, DKV-MO25743BO
25	43048066	Accumulator Ass'y
26	43146584	Valve, Packed, 9.52DIA, HKT9.52
27	43047401	Bonnet, 3/8 IN, 9.52 CU
28	43146613	Valve, Ball, B5/8F
29	43194029	Bonnet
30	43148169	Strainer
31	43148176	Strainer
32	43058266	Reactor, CH-47-Z-K
33	43063321	Holder, Sensor, 4-8, 9.52
34	43063322	Holder, Sensor, 6-11.4, 12.7
35	43063325	Holder, Sensor, 6-6.35, 8
36	43063332	Holder, Sensor
37	43032441	Nipple, Drain

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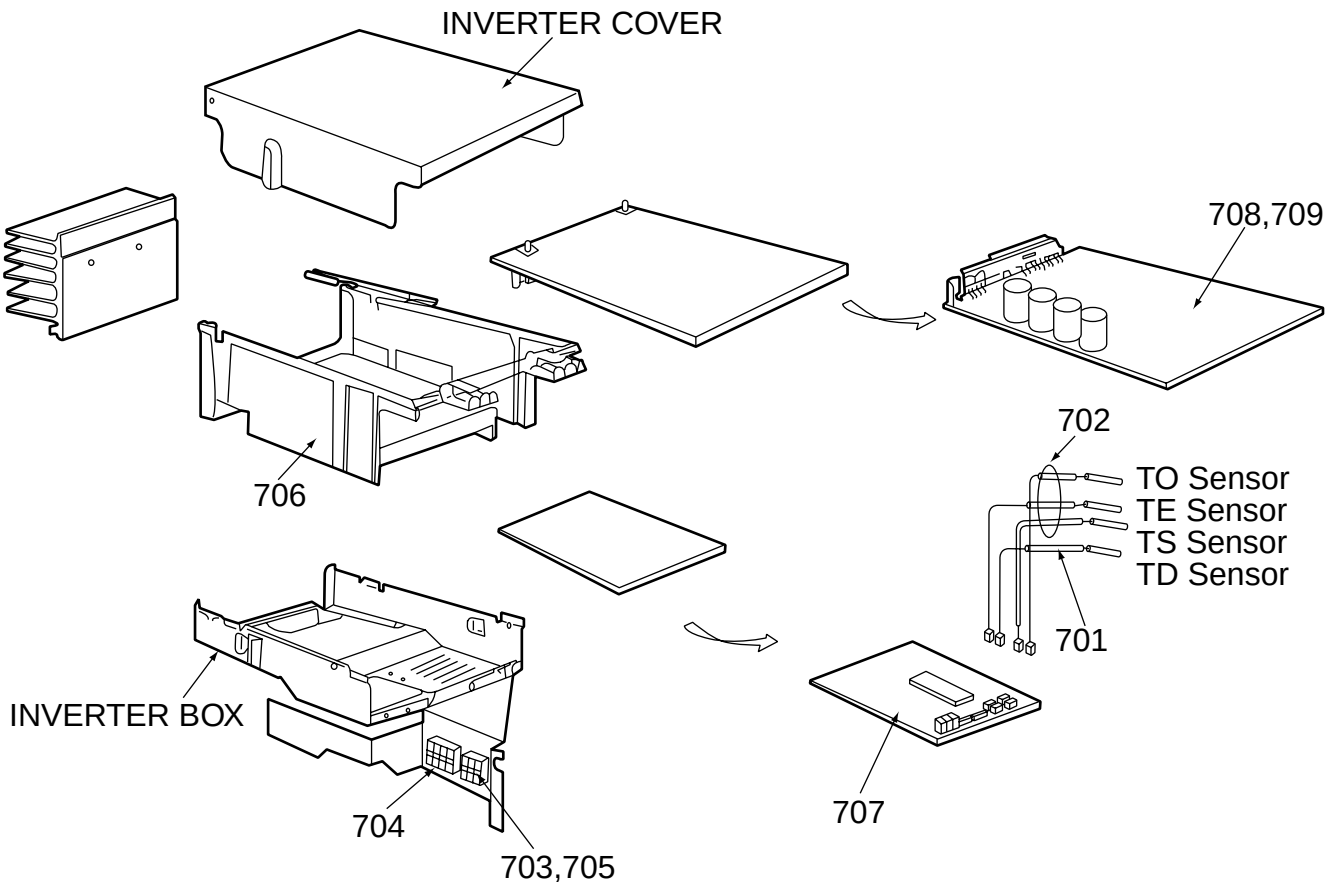
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy



Location No.	Part	Description
701	43050334	Sensor, TD (F4), TD Sensor
702	43050382	Sensor, TC (F6), TC Sensor
704	43160469	Terminal Block, 6P, AC250V, 20A
705	43162042	Base, P.C. Board, ABS
707	4316V183	P.C. Board Ass'y, CDB, MCC-1398
708	4316V184	P.C. Board Ass'y, IPDU, MCC-1359

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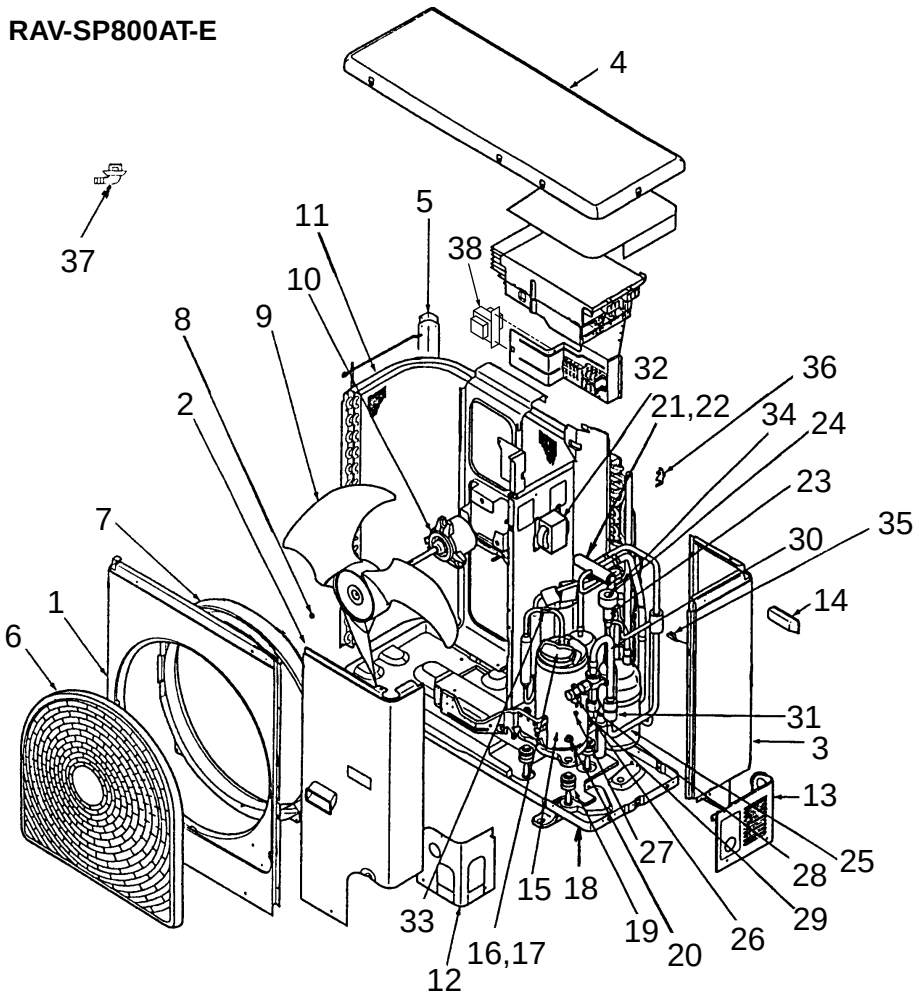
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SP560AT-E, RAV-SP800AT-E
(A03-014)



Location No.	Part	Description
1	43191634	Cabinet, Air Outlet
2	43191636	Cabinet, Front Ass'y
3	43191635	Cabinet, Side Ass'y
4	43191637	Panel, Upper
5	43005489	Guard, Fin
6	43191630	Guard, Fan, PP-K
7	43122065	Bell, Mouth
8	43047667	Nut, Flange
9	43120213	Fan, Propeller, PJ491, AS-G
10	43121704	Motor, Fan, ICF-140-63-2
11	4314G116	Condenser Ass'y (SP800AT-E)
11	4314G117	Condenser Ass'y (SP560AT-E)
12	43191515	Panel, Front, Piping
13	43191605	Panel, Back, Piping
14	43119390	Hanger
15	43041772	Compressor Ass'y, DA220A2F-20L
16	43050407	Thermostat, Bimetal
17	43063317	Holder, Thermostat
18	43005482	Base Ass'y
19	43049739	Cushion, Rubber
20	43097204	Nut
21	43146619	Valve, 4-Way, STF-0213Z
22	43046348	Coil, Solenoid, VHV-01A1501A1

Location No.	Part	Description
23	43046385	Valve, Pulse, Modulating, SKV-18D26
24	43046386	Coil, PMV, DKV-M025743B0
25	43048066	Accumulator Ass'y
26	43046392	Valve, Packed, 6.35 (SP560AT-E)
26	43146584	Valve, Packed, 9.52DIA (SP800AT-E)
27	43047401	Bonnet, 3/8 IN (SP800AT-E)
27	43147196	Bonnet, 1/4 IN (SP560AT-E)
28	43046393	Valve, Packed, 12.7, HKU-R410A-H4 (SP560AT-E)
28	43146613	Valve, Ball (SP800AT-E)
29	43147194	Bonnet, 5/8 IN (SP800AT-E)
29	43147195	Bonnet, 1/2 IN (SP560AT-E)
30	43148169	Strainer
31	43148168	Strainer (SP560AT-E)
31	43148176	Strainer (SP800AT-E)
32	43058266	Reactor, CH47-Z-K
33	43063321	Holder, Sensor
34	43063322	Holder, Sensor
35	43063325	Holder, Sensor
36	43063332	Holder, Sensor
37	43032441	Nipple, Drain
38	43058268	Reactor, CH-43-Z-K

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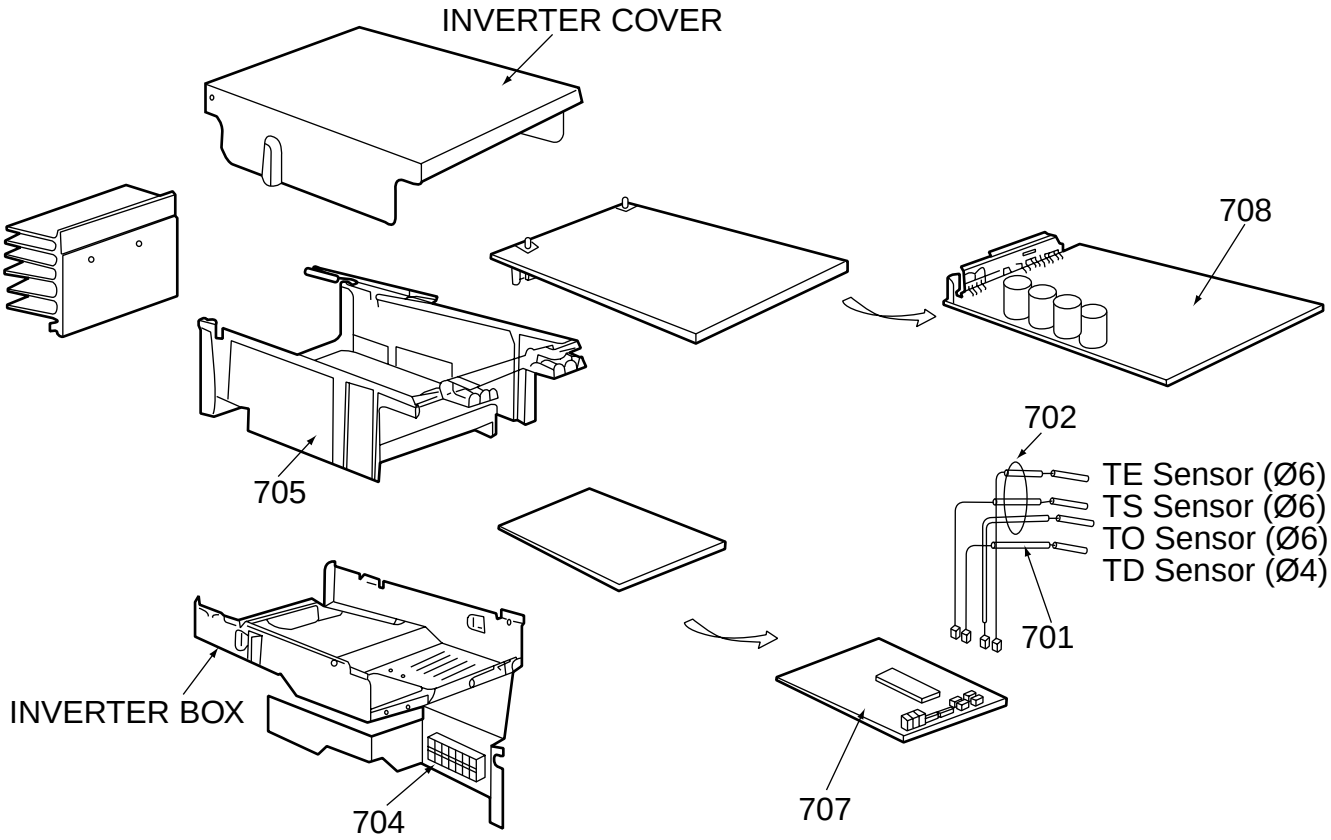

Location No.	Part	Description
701	43050334	Sensor, TD (F4)
702	43050382	Sensor, TE, TS, TO (F6)
704	43160469	Terminal Block, 6P, AC250V, 20A

Location No.	Part	Description
705	43162042	Base, P.C. Board
707	4316V231	P.C. Board Ass'y, CDB, MCC-1398
708	4316V184	P.C. Board Ass'y, IPDU, MCC-1359

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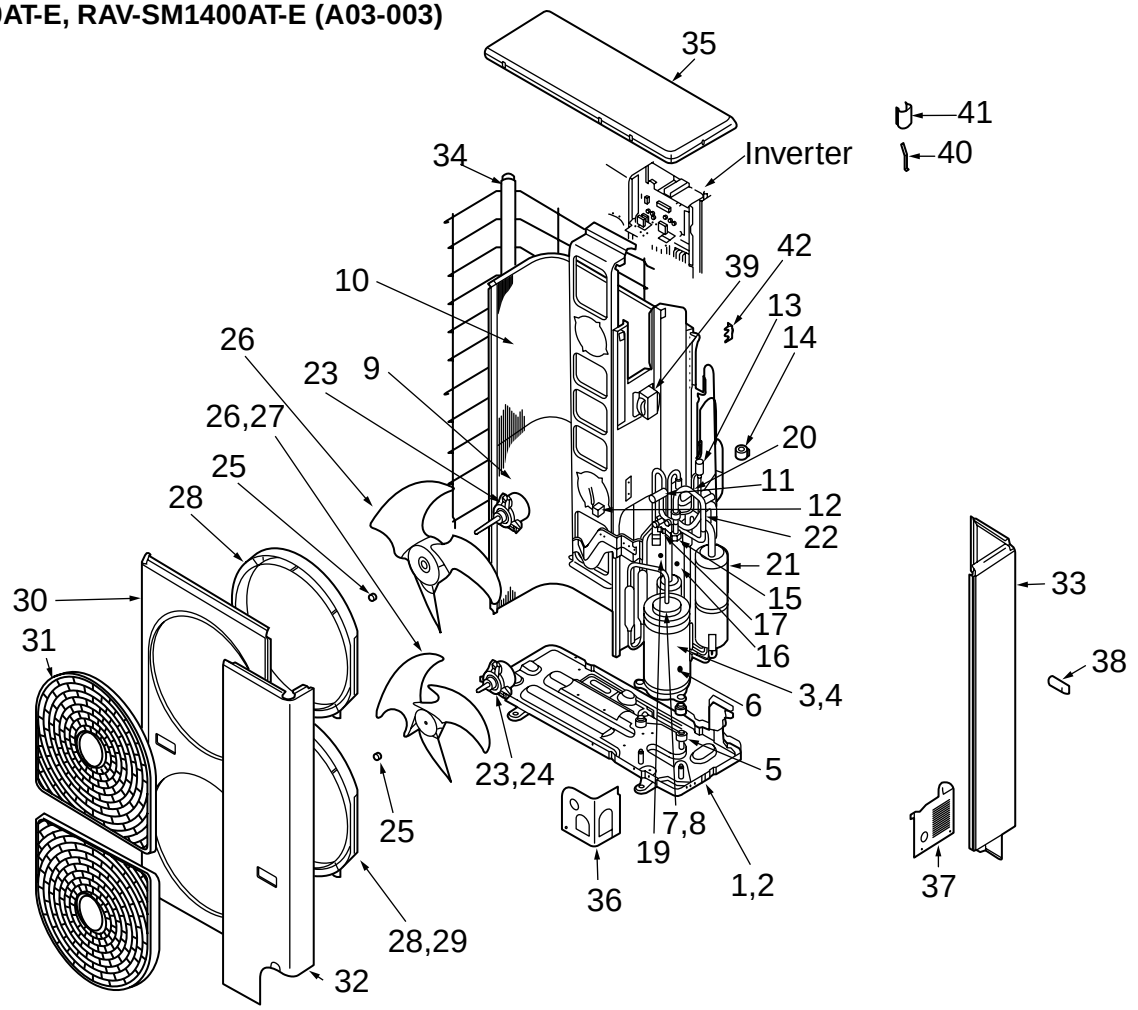
RAV-SM1100AT-E, RAV-SM1400AT-E (A03-003)



Location No.	Part	Description
1	43005482	Base Ass'y (SM1100AT-E)
2	43100248	Base Ass'y (SM1400AT-E)
3	43041772	Compressor Ass'y, DA220A2F-20L (SM1100AT-E)
4	43041774	Compressor Ass'y, DA420A3F-21M (SM1400AT-E)
5	43049739	Cushion, Rubber
6	43097204	Nut
7	43050407	Thermostat, Bimetal
8	43063317	Holder, Thermostat
9	4314G152	Condenser, Ass'y, Down
10	4314G154	Condenser, Ass'y, Up
11	43146619	Valve, 4-WAY, STF-0213Z
12	43146611	Coil, Solenoid, VHV-01AJ502E1, AC 220–240V
13	43146634	Valve, Pulse, Modulating, UKV-25D22
14	43146614	Coil, PMV
15	43146613	Valve, Ball, 5/8 IN
16	43147194	Bonnet, 5/8 IN
17	43146584	Valve, Packed, 3/8 IN
19	43047401	Bonnet, 3/8 IN
20	43147611	Strainer

Location No.	Part	Description
21	43148170	Accumulator Ass'y, 2.5L
22	43148176	Strainer
23	43121704	Motor, Fan, ICF-140-63-2
24	4302C040	Motor, Fan, ICF-140-43-2 (SM1100AT-E)
25	43047667	Nut, Flange
26	43120213	Fan, Propeller, PJ491, AS-G
27	43020329	Fan, Propeller, PJ421, AS-G (SM1100AT-E)
28	43122065	Bell Mouth, Plastic
29	43122074	Bell Mouth, PP (SM1100AT-E)
30	43191606	Panel, Air Outlet
31	43191630	Guard, Fan, PP-K
32	43191607	Panel, Front
33	43191608	Panel, Side
34	43191602	Guard, Fin
35	43191609	Plate, Roof
36	43191515	Panel, Front, Piping
37	43191605	Panel, Back, Piping
38	43119390	Hanger
39	43155188	Peacter, CH-56-2Z-T
40	43019904	Holder, Sensor, SUS
41	43063188	Holder, TC Sensor
42	43063332	Holder, Sensor
43	43032441	Nipple, Drain

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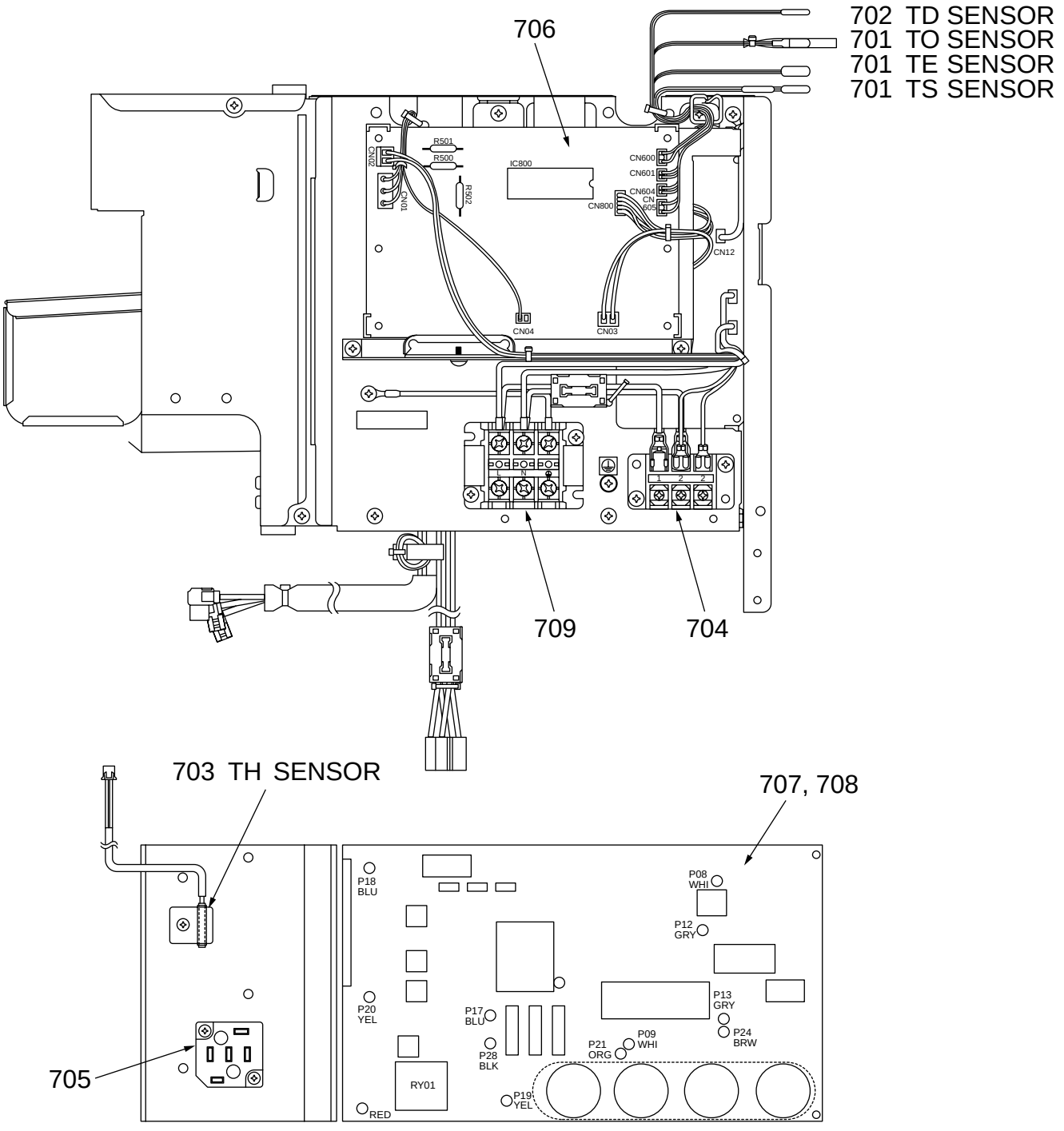
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy



Location No.	Part	Description
701	43050382	Sensor, TC (F6)
702	43050384	Sensor, TD
703	43050398	Sensor, TH (F4)
704	43060750	Terminal Block, 3P
705	43150295	Rectifier
706	4316V217	P.C. Board Ass'y, CDB, MCC-1398, 2-Fan

Location No.	Part	Description
707	4316V218	P.C. Board Ass'y, IPDU, MCC-1438 (SM1100AT)
708	4316V219	P.C. Board Ass'y, IPDU, MCC-1438 (SM1400AT)
709	43160552	Terminal Block, 3P (Power Supply)

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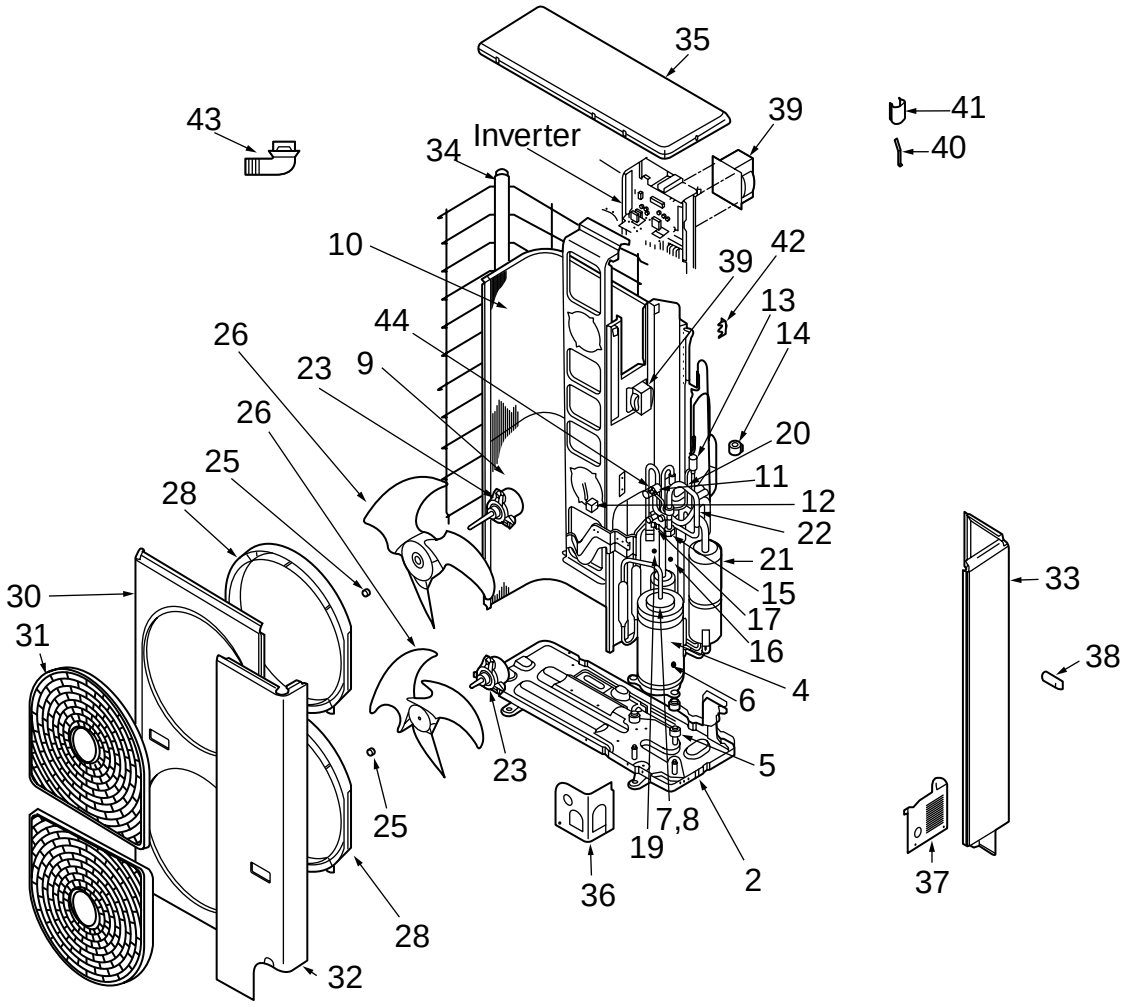
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

RAV-SP1100AT-E, RAV-SP1400AT-E (A03-014)



Location No.	Part	Description
2	43100248	Base Ass'y
4	43041774	Compressor Ass'y, DA420A3F-21M
5	43049739	Cushion, Rubber
6	43097204	Nut
7	43050407	Thermostat, Bimetal
8	43063317	Holder, Thermostat
9	4314G144	Condenser Ass'y, Down
10	4314G147	Condenser Ass'y, Up
11	43146618	Valve, 4-Way, STF-0401G
12	43146611	Coil, Solenoid, VHV-01AJ502E1
13	43146634	Valve, Pulse, Modulating, UKV-25D22
14	43146614	Coil, PMV, UKV-U011E
15	43146613	Valve, Ball
16	43147194	Bonnet, 5/8 IN
17	43146584	Valve, Packed, 9.52DIA
19	43047401	Bonnet, 3/8 IN
20	43147611	Strainer
21	43148170	Accumulator Ass'y

Location No.	Part	Description
22	43147648	Strainer
23	43121704	Motor, Fan, ICF-140-63-2
25	43047667	Nut, Flange
26	43120213	Fan, Propeller, PJ491
28	43122065	Bell Mouth
30	43191606	Panel, Air Outlet
31	43191630	Guard, Fan, PP-K
32	43191607	Panel, Front
33	43191608	Panel, Side
34	43191602	Guard, Fin
35	43191609	Plate, Roof
36	43191515	Panel, Front, Piping
37	43191605	Panel, Back, Piping
38	43119390	Hanger
39	43155188	Reactor, CH-56-2Z-T
40	43019904	Holder, Sensor
41	43063188	Holder, TC Sensor
42	43063332	Holder, Sensor
43	43032441	Nipple, Drain
44	43146588	Joint, Check

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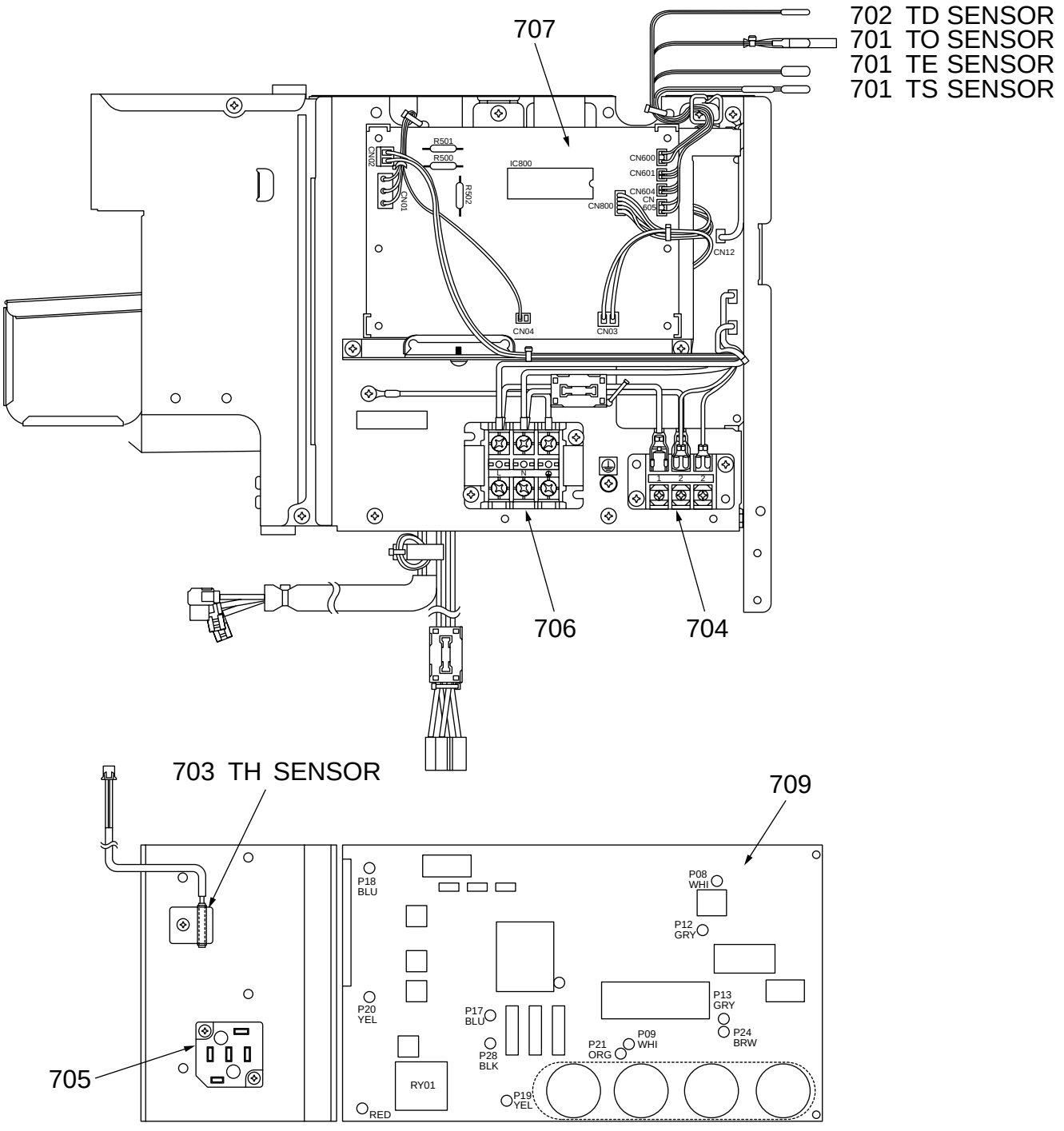
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy



Location No.	Part	Description
701	43050382	Sensor, TO, TE, TS (F6)
702	43050384	Sensor, TD
703	43050398	Sensor, TH (F4)
704	43060750	Terminal Block, 3P
705	43150259	Rectifier, 30A, 800V

Location No.	Part	Description
706	43160552	Terminal Block, 3P, 30A
707	4316V231	P.C. Board Ass'y, CDB, MCC-1398
709	4316V219	P.C. Board Ass'y, IPDU, MCC-1438

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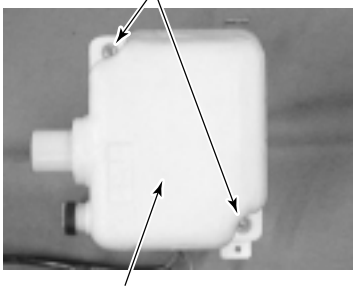
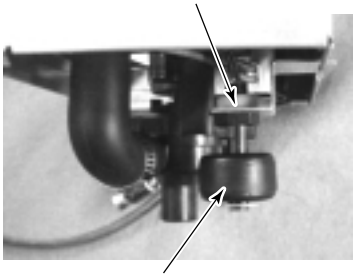
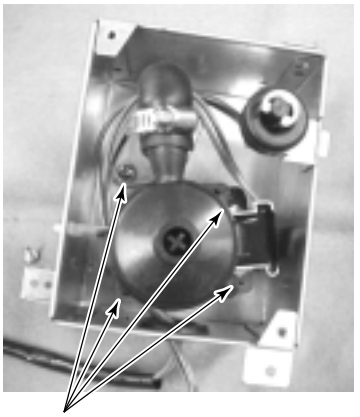
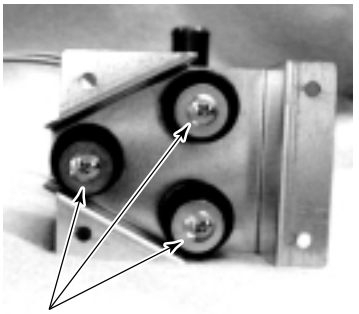
Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

15-3. Replacement of Main Parts (Sold Separately)

15-3-1. Drain up Kit

TCB-DP22CE (A03-016)

No.	Part name	Procedure	Remarks
①	Drain pan	1. Remove the Drain up kit from the main unit. 2. Remove the set screws (2 positions) and drain pan.	Screws (Fixing drain pan and main unit)  ①-2 Drain pan
②	Float switch	1. Remove the drain pan. 2. Remove the plastics nut of fixing float switch. 3. Remove the float switch.	Plastics nut  ②-2 Float switch
③	Drain pump	1. Remove the drain pan. 2. Remove the set screws (4 positions) of fixing drain pump plate and main unit. 3. Remove the screws (3 positions) of fixing drain pump plate and drain pump.	 ③-2 Screws (Fixing drain pump and main unit)  ③-3 Screws (Fixing drain pump and drain plate)

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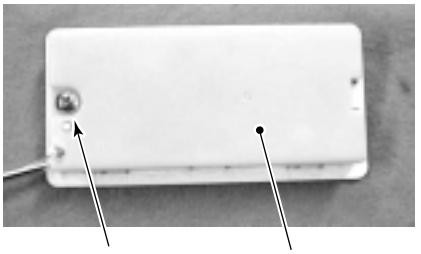
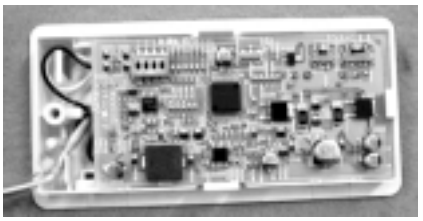
15-3-2. Wireless Remote Control Kit

RBC-AX22CE (A03-016)

No.	Part name	Procedure	Remarks
①	P.C. board	1. Remove the signal receiving unit from main unit. 2. Remove the set screw (1 position) and P.C. board cover. 3. Remove the p.c. board.	 ①-2 Screw P.C. board cover  ①-3

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Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

16. CORD HEATER INSTALLATION WORK

Applicable Models: RAV-SM1100AT-E, RAV-SM1400AT-E (A03-003)

1. Required parts for installation work (Recommendation)

No.	Part name	Q'ty	Specifications/Vendor	Remarks
1	Cord heater	1	Drain line heaters CSC2 (3.0m, 40W/m) by Flexelec com. (Please go to the following URL.) http://www.flexelec.com	Procured locally
2	Thermostat	1	US-622AXRLQE by ASAHI KEIKI Operating temperature: on 4 ± 4°C, off 15 ± 3°C A thermostat holder is incorporated with a thermostat in the package. (Please go to the following URL.) http://www.asahikeiki.co.jp/product/product.html On self-responsibility, you can use a product manufactured by other company (For example, Texas Instruments) if its characteristics are equivalent to those of ASAHI KEIKI. However, when the shape of the thermostat holder is different from that of ASAHI KEIKI, apply some treatment to No.13 themostat fixing plate and then fix the holder.	Procured locally
3	Fuse	1	ES3-5000, 250V / 5A by NAGASAWA Electric Co. (Please go to the following URL.) http://www.nagasawa-el.co.jp/ On self-responsibility, you can use a product manufactured by other company if its characteristics are equivalent to those of NAGASAWA Electric Co.	Procured locally
4	Fuse holder	1	GM1H-02 by NAGASAWA Electric Co. (Please go to the following URL.) http://www.nagasawa-el.co.jp/ On self-responsibility, you can use a product manufactured by other company if its characteristics are equivalent to those of NAGASAWA Electric Co.	Procured locally
5	P-shape clamp	16	Use heat-resistance, weatherproof and non-hydrolytic type. Material: 4-fluorinated ethylene copolymer Harness diameter: Ø7.5 Use equivalence with the above specifications. 12 pieces are used to fix the cord heater to the outdoor unit base. One piece is used to fix the power cords to the thermostat fixing plate.	Procured locally
6	Screw	15	Self-tapping screw type-B Ø4 × 6mm, truss head, stainless These screws are used to fix the cord heater to the outdoor unit base with P-shape clamp.	Procured locally
7	Screw	3	Self-tapping screw type-B Ø4 × 8mm, truss head, stainless Two screws are used to fix the thermostat fixing plate to the back cabinet. One screw is used to fix the power cord to the thermostat fixing plate.	Procured locally
8	Screw	2	Self-tapping screw type-B Ø3.5 × 8mm, pan head These screws are used to fix the thermostat to the thermostat fixing plate with the thermostat holder.	Procured locally
9	Faston	2	#250 They are used for the connecting part to the thermostat.	Procured locally
10	Sleeve for Faston	2	UL sleeve for #250	Procured locally
11	Close-end connector	2	Use the most appropriate connector with the power cord diameter.	Procured locally
12	Power cord	1	2-cores x 0.75mm² or more, H05RN-F	Procured locally
13	Thermostat fixing plate	1	Material: SGCC-Z08, Board thickness: 0.8t	Procured locally (Drawing attached)

NOTE: The parts on the above table are recommended parts.

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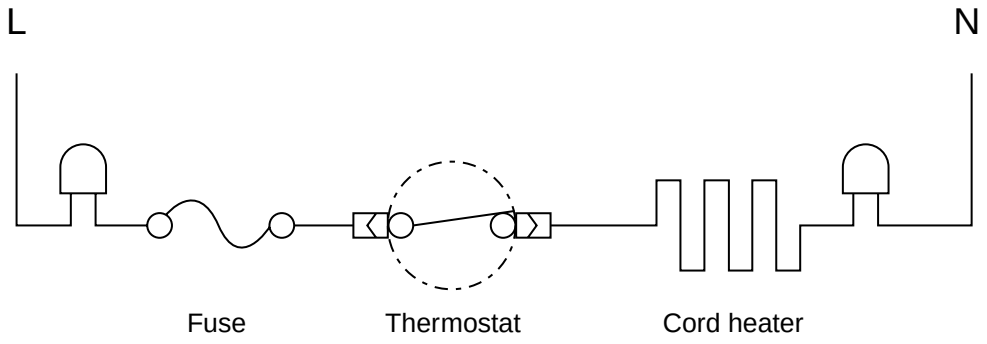
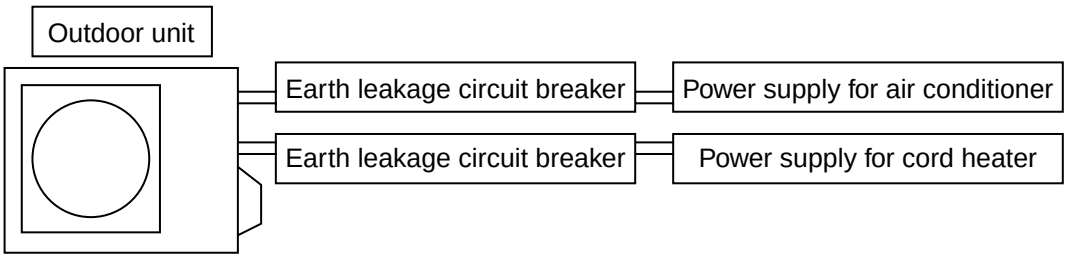
2. Required tools for installation work

No.	Part name	Specifications	Usage
1	Plus screwdriver		It is used for disassembling and assembling of each cabinet.
2	Wrench		It is used for disassembling and assembling of compressor fixing nuts.
3	Motor drill	Drill diameter: Ø3.2 and Ø5.0	It is used to make the additional holes on the base or the back cabinet.
4	Faston crimping tool	Fixing jig for #250	
5	Close-end connector crimping tool		
6	Cutting plier		
7	Stripper		
8	Cutter knife		
9	Insulation tape		

3. Cord heater installation wiring diagram



* Be sure to connect the fuse and the thermostat to LIVE side of the cord heater.


Outdoor unit
Earth leakage circuit breaker
Power supply for air conditioner
Earth leakage circuit breaker
Power supply for cord heater

NOTE:

Separate the cord heater power from the air conditioner power, and connect it to its exclusive breaker.

By doing so, the power consumption can be decreased because the breaker can be turned off if there is no possibility of freezing of the base in cooling operation, etc.

When the cord heater power is connected to the inverter P.C. board assembly or others without connected to the exclusive breaker, the control P.C. board of the inverter assembly may cause a failure.

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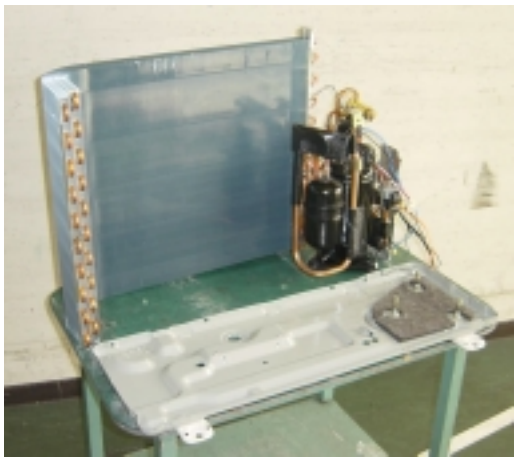
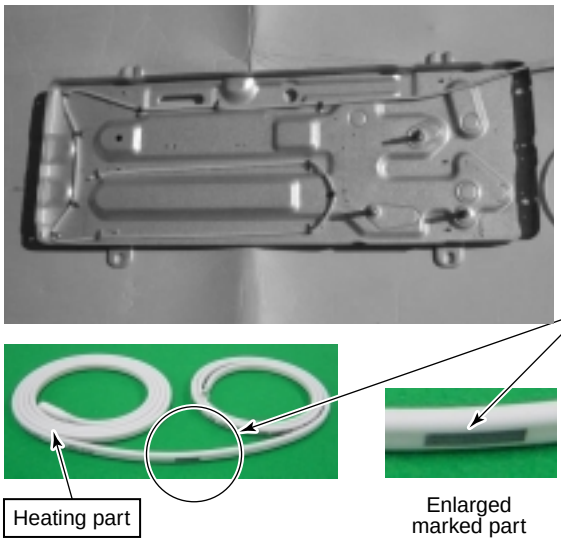
4. Cord heater installation work procedure

No.	Photo / Explanatory diagram	Procedure
1	Remove each cabinet, inverter assembly, motor base assembly, and partition board assembly. * Do not damage the electric parts such as cables, connectors, etc. while this work.	
1-2	**<Example for RAS-13JAVP-E>** 	As shown in the left figure, remove the set of refrigeration cycle assembly from the outdoor unit base. * In this time, work attentively so that the cycle pipes are not damaged by dent or deformation. Apply protective measures to pipes if necessary.
2	Cord heater installation work Drill a hole on the outdoor unit base, and fix the cord heater to the outdoor unit base using P-shape clamp. Connect the cord heater cables.	
2-1	Using a motor drill, etc., drill Ø3.2 holes to the existing emboss on the outdoor unit base. (12 positions)	
2-2	 	As shown in the left figure, install the cord heater to the outdoor unit base by using P-shape clamp and screws (Self-tapping screw type-B Ø4 × 6mm, stainless). Pay attention to the direction of P-shape clamp so that it is set to the same direction in the left figure. * If the drain port is frozen due to installation status, etc., draw around the cord heater so that the end part of the heater is inserted into the drain port. In this case, add some fixing positions to fix the cord heater surely. * The end part from the marked part of the cord heater heats up. When there is the heating part near the electric parts box, a fire may generate. Be sure to set the heating part on the outdoor unit base at the fan room side or near it. (within 20cm from the outdoor unit base) * Be careful that the cord heater does not hit the fan. Fix the cord heater without any loosening or sag
2-3	 	As shown in the left figure, drill a hole on the back cabinet for fixing the thermostat fixing plate. Ø5 hole at two positions When drilling a hole on the back cabinet, be sure not to damage the cabinet.

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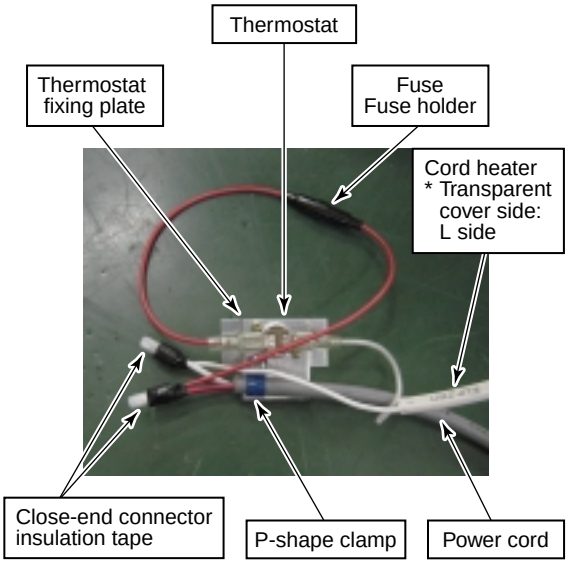
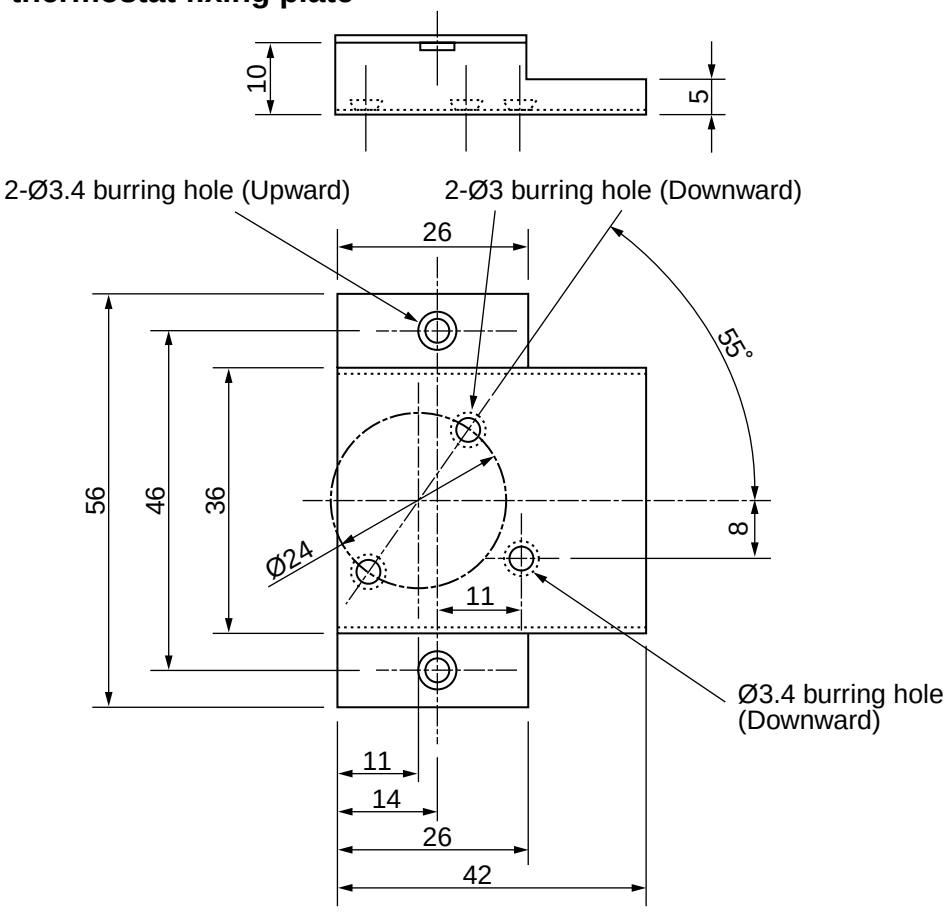
No.	Photo / Explanatory diagram	Procedure
2-4		Perform end process and bundling of each cable. Using fixing screws (Self-tapping screw type-B Ø3.5 × 8mm), fix the thermostat to the thermostat fixing plate. Perform end process for various lead cables and connect them according to the wiring diagram. Attach #250 Faston and UL-approved sleeves each to the end of lead cables which are connected to the thermostat. Using insulation tape, apply protective measures to the connected parts by the close-end connectors. Using P-shape clamp and the screws (Self-tapping screw type-B Ø4 × 8mm), fix the power cord to the thermostat fixing plate. When the power cord size does not match with P-shape clamp, procure the most appropriate one at the local site.
3	**Assembly** Return a set of the refrigeration cycle assembly into the outdoor unit base and reassemble sound insulation board, partition plate assembly, fan motor assembly, and back cabinet as original. Fix the thermostat fixing plate to the back cabinet, built in the inverter assembly, and then connect various cables. After then, incorporate front cabinet, upper cabinet, wiring cover, and valve cover as before.	
4	In installation work, connect power cord for the cord heater to another breaker separated from one for power cord of the air conditioner.	

5. Drawing of thermostat fixing plate



Material: SGCC-Z08, Thickness: 0.8t

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APPENDIX-1

1. SDI combination, Indoor / Outdoor

		2 HP RAV-	3 HP RAV-	4 HP RAV-	5 HP RAV-
4-way Cassette Type	Indoor	SM560UT-E	SM800UT-E	SM1100UT-E	SM1400UT-E
	Outdoor	SP560AT-E	SP800AT-E	SP1100AT-E	SP1400AT-E
Concealed Duct Type	Indoor	SM560BT-E SM561BT-E	SM800BT-E SM801BT-E	SM1101BT-E	SM1401BT-E
	Outdoor	SP560AT-E	SP800AT-E	SP1100AT-E	SP1400AT-E
Under Ceiling Type	Indoor	SM561CT-E	SM801CT-E	SM1101CT-E	SM1401CT-E
	Outdoor	SP560AT-E	SP800AT-E	SP1100AT-E	SP1400AT-E
High Wall Type	Indoor	SM560KT-E	SM800KT-E	—	—
	Outdoor	SP560AT-E	SP800AT-E	—	—

Do not connect at 4 HP 4-way Cassette, RAV-SM1100UT-E —-XXX— RAV-SP1100AT-E
No Error code show, Q down & may happen Reliability problem.

2. Service parts for 4-way Cassette Type

	2 HP	3 HP	4 HP		5 HP
	SM560UT-E	SM800UT-E	SM1100UT-E	SP1100UT-E	SM1400UT-E
H	256			319	
W	840			840	
D	840			840	
Fan	43120215			43021214	
Fan motor	43121692 60W1680 m³/h (SWF-230-60-1)			43121691 90W1980 m³/h (SWF-200-90-1)	
P.C. board	4316V188 (MCC-1402-04)		4316V220 (MCC-1402-04)		
Eva.	4314J122	4314J123		4314J124	
Drain pump	43121703				
Float SW	43151279				

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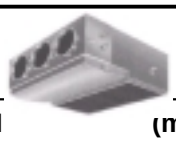
3. Specification for Concealed Duct Type

			2 HP	3 HP	4 HP	5 HP
			SM561BT-E	SM801BT-E	SM1101BT-E	SM1401BT-E
DC Duct	H	(mm)	320	320	320	
	W	(mm)	700	1000	1340	
	D	(mm)	800	800	800	
	Weight	(kg)	30	39	54	
	Motor (DC motor)		120 W			
	Air flow	(m^3/h)	840	1140	1620	1980

			2 HP	3 HP	4 HP	5 HP
			SM560BT-E	SM800BT-E	—	—
AC Duct	H	(mm)	320	320	—	—
	W	(mm)	700	1000	—	—
	D	(mm)	800	800	—	—
	Weight	(kg)	39	53	—	—
	Motor (AC motor)		60 W	100 W	—	—
	Air flow	(m^3/h)	840	1140	—	—

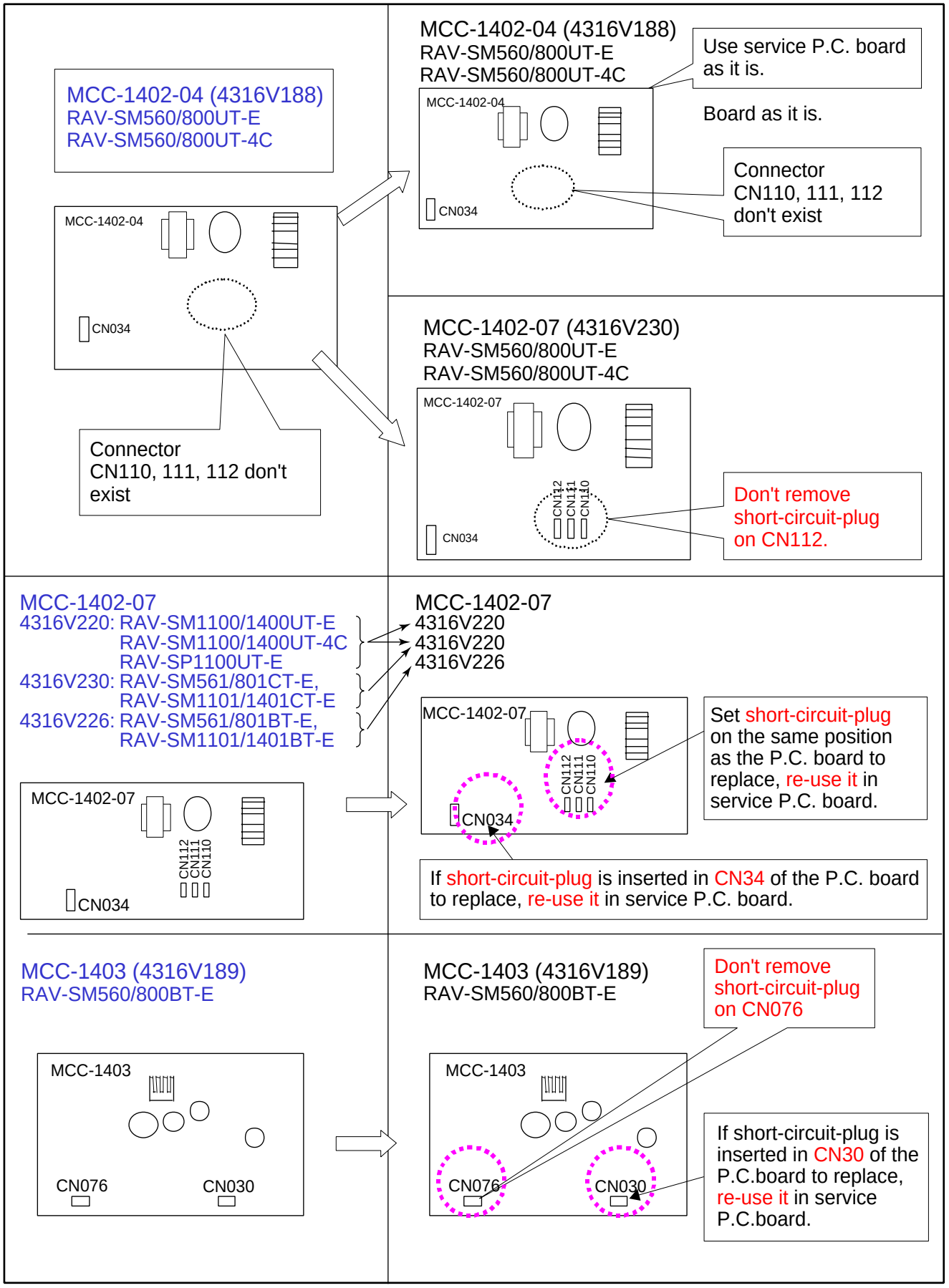
4. Service parts for Concealed Duct Type

	DUCT (AC)		New Duct (DC)			
	2 HP	3 HP	2 HP	3 HP	4 HP	5 HP
	SM560BT-E	SM800BT-E	SM561BT-E	SM801BT-E	SM1101BT-E	SM1401BT-E
Fan	42120149			43120220		
Q'ty	1	2	1	2	3	
Fan motor	43121643	43121645	43121708	43121707	43121708	
Capacitor	43155088 2.5 µF	43155096 5 µF	—			
Air filter	43119462	43119463	43180311	43180312	43180311	
Q'ty	1	2	1	2	2	
Transformer	43158180		—			
P.C. board	4316V189		4316V226			
Eva.	4314J100	4314J101	4314J182	4314J183	4314J184	
Drain pan	43191304	43191305	43172168	43172167	43172166	
Float SW	—		43151281			
Drain pump	43121688		43121713 (Pump Ass'y, Wiring)			
Service P.C. board	4316V189 : MCC-1403		43116V226 : MCC-1402			

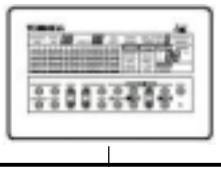
5. Service parts for Under Ceiling Type

	2 HP	3 HP	4 HP	5 HP
	SM561CT-E	SM801CT-E	SM1101CT-E	SM1401CT-E
Multi blade fan	43120222			
Q'ty	2	3	4	
Fan motor	43121715	43121716	43121714	
Air filter	43180314	43180315	43180314 / 1	
Q'ty	2	2	43180315 / 1	
Drain pan ass'y	43171173	43172174	43172175	
Drain pump	Accessory (TCB-DP22CE)			
Side-cover R	43102647			
Side-cover L	43102648			
Under panel	43191663	43191664	43191665	
Eva.	4314J198	4314J187	4314J188	
P.C. board	4316V230 (MCC-1402-07)			
Reactor	43158184			
Capacitor	43155192			

6. Service PCB Replacement



7. Indoor unit & Remote controller

Cassette (UT-E)	Duct (BT-E)	Ceiling (CT-E)	High Wall (KRT-E)	*E-Flex
RAV-SM560, 800, 1400 RAV-SP1100	RAV-SM560, 800 RAV-SM561, 801, RAV-SM1101, 1400	RAV-SM561, 801, RAV-SM1101, 1401	RAV-SM560, 800	Responsibility by TCTC (THAI)
Wireless TCB-AX21U(W)-E Cassette only	Wired RBC-AMT21E	Wired RBC-AS21E	RBC-SR1-PE	
Weekly timer RBC-EXW21E		Remote sensor TCB-TC21LE	Wireless RBC-IR1-PE	Wireless Accessories
Central Remote controller & Adapter			Central Remote controller without Adapter RBC-CR64-PE	

8. Connecting cable for Remote controllers

Neutral 2-cores type	RBC-AMT21E RBC-AS21E TCB-AX21U (W)-E, (Wireless)
Polarized 3-cores type	RBC-SR1-PE RBC-CR64-PE

Toshiban lämmitys- ja jäähdytyslaitteiden jälleenmyyjä pääkaupunkiseudulla on Jäähdytinpalvelu RefGroup Oy

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